Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers

Monitoring Times

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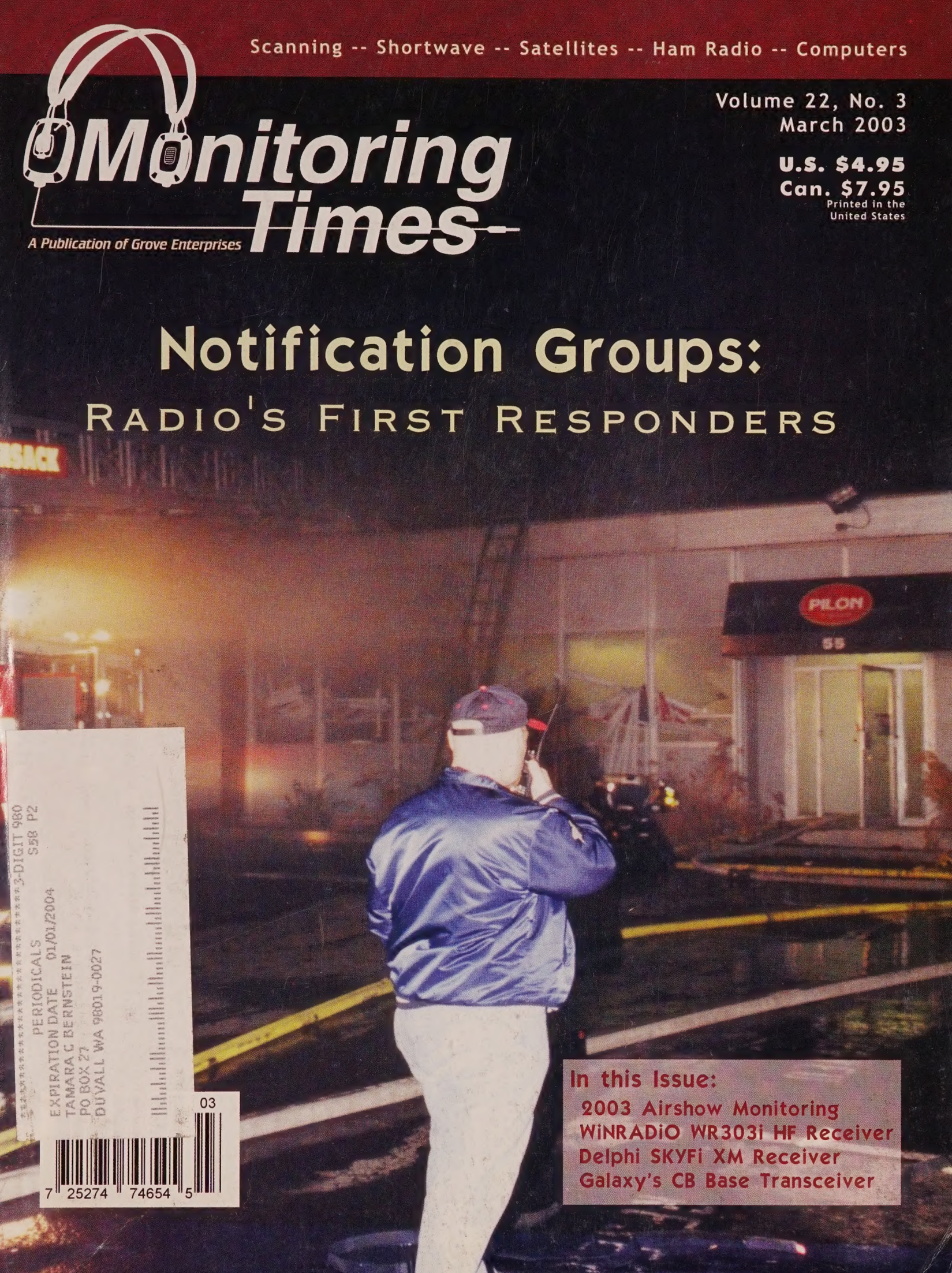
Notification Groups:

Radio's First Responders



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2003 Airshow Monitoring
WiNRADiO WR303i HF Receiver
Delphi SKYFi XM Receiver
Galaxy's CB Base Transceiver

AOR introduces the NEW AR8200 Mark III

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- **New TCXO for greater stability – performance not found in most *desktop* units!**
- **Covers 500 KHz ~ 3 GHz – world's first handheld with this range!***
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- Wide choice of accessories

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Now you can own the world-class AR8200 Mark III portable receiver with unparalleled frequency coverage from 500 KHz to 3 GHz. An even better Temperature Compensated Crystal Oscillator for solid frequency stability. Improved RF circuits combine greater sensitivity, resistance to intermod products and enhanced Signal to Noise ratios. The Mark III features better audio frequency response and includes NiMH AA cells that can be charged while operating the receiver. When you're ready for the best, you're ready for AOR – ***The Authority on Radio.™***

**Cellular blocked on USA models, unblocked version available to qualified agencies, documentation required. Specifications subject to change without notice or obligation.*

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"A shock to the system." *

The new WiNRADiO G303i receives rave reviews. And shortwave radios will never be the same.

* *Shortwave Magazine, February 2003*

The exciting WiNRADiO G303i Software-Defined Shortwave Receiver is now available.

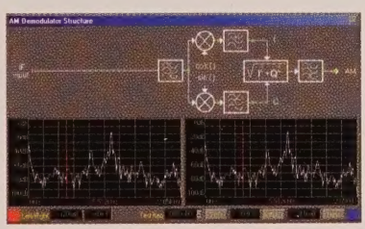
Why is it *Software-Defined*? Because the entire last intermediate frequency stage and all-mode demodulator are implemented entirely in signal-processing software running on a personal computer. This brings about significant advantages: performance, flexibility, configurability, reliability and convenience. There is also reduced risk of obsolescence, as new demodulators for new types of modulation are as easy to add as inserting a CD ROM into a PC drive.

The receiver comes on a PCI card and installs in minutes. Just plug the card in, connect its output to your PC sound card, install the supplied software, and let the world's most innovative shortwave receiver surprise you with its performance and amazing new features.

In addition to the flexible and friendly user interface with numerous functions and facilities not normally available on a conventional receiver, the WiNRADiO G303i Software-Defined Shortwave Receiver excels particularly with the ability of its demodulators: While the Standard Demodulator provides the performance of a highly respectable shortwave receiver, including synchronous AM demodulation and a real-time spectrum scope, the optional Professional Demodulator offers even more: continuous selectivity setting (in 1 Hz increments), interactive block diagrams with additional real-time audio spectrum scopes, built-in performance test facilities, user adjustable filters, and many other features. Additional demodulator types are planned as further options, including a DRM (digital radio) demodulator.

Just when you thought that there is nothing in shortwave that can surprise you anymore, here comes the new WiNRADiO G303i. It ***will*** impress you. We guarantee it.

The G303i control panel includes many features such a real-time spectrum analyzer, numerous tuning and scanning options, highly accurate S-meter showing signal strength in various units, sweeping spectrum scope and powerful memory facilities.



The optional Professional Demodulator expands the receiver capabilities yet further by introducing numerous innovative features, world-first for this type of radio, such as variable filter bandwidth adjustment and interactive block diagrams.

Specifications

- Frequency range 9kHz to 30MHz
- Tuning resolution 1Hz
- Modes AM, AMN, AMS, USB, LSB, CW, FM3, FM6, FMN
- Sensitivity 0.3µV (AM, 80% modulation, 10dB S/N)

System Requirements

- IBM PC compatible (CPU 500MHz or higher, PCI slot)
- Sound Blaster 16 (or compatible sound card)
- Windows 98/ME/NT/2000/XP

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The WR-G303i receiver was reviewed by the Shortwave Magazine (Feb. 2003), Monitoring Times (March 2003) and Radio & Communications (Feb. 2003), with impressive conclusions. Here are only a few highlights of the reviews:

On spurious signal rejection: "As far as I can remember I have never found any receiver, analogue or digital, which had such cleanliness, and the WR-G303i has set a new standard for others to emulate." *[SWM]*

On sensitivity: "... higher than necessary in a receiver of its type...". *[SWM]* • "Much of this sensitivity is contributed by the low phase noise of the oscillator, typically -148dBc/Hz @ 100 kHz. Clearly this radio meets or exceeds the competition head on..." • "With a sharp filter selection using the Professional Demodulator, CW signals as weak as 30nV (0.03 uV) are distinct." *[MT]* • "In short, the performance is superb. The sensitivity and selectivity surpassed my expectation, and there was no sight of intermod even in the presence of strong stations at night time." *[R&C]*

On variable IF bandwidth: "... a very useful feature and allows you to exactly match the filter bandwidth to the incoming signal ... once experienced never to be forgotten." *[SWM]* • "... an astounding feature to hear when invoked!" *[MT]* • The experience of being able to finely tune selectivity to suit a particular signal you are listening to is truly incredible, especially if you have been used to having just a few fixed bandwidths on your old radio." *[R&C]*

The verdict: "If I had to choose between a Collins 95S-1 and the WR-G303i (ignoring the obvious fact that the 95S-1 tunes to 2 GHz), I would take the WR-G303i." *[SWM]* • "This receiver is a gadget-owner's dream! But it isn't fantasy; for the first time in consumer technology, the shortwave listener can tailor his receiver to his own requirements, independent of factory-set parameters." *[MT]* • "The WiNRADiO WR-G303 receiver, in addition to being an excellent receiver on its own right, has a certain exciting feeling about it. Perhaps this is because of the promise of a change of an entire paradigm which makes a difference between just another run-of-the-mill product and a truly innovative cult product, sparking an entirely new following." *[R&C]*

Check out the special introductory price of the Professional Demodulator option which includes the following additional features:

- **Variable IF bandwidth (1Hz to 15kHz)**
- **ISB and DSB modes**
- **Variable filter length (selectivity) adjustment**
- **Interactive demodulator structures**
- **Vector voltmeter, THD and SINAD meter**

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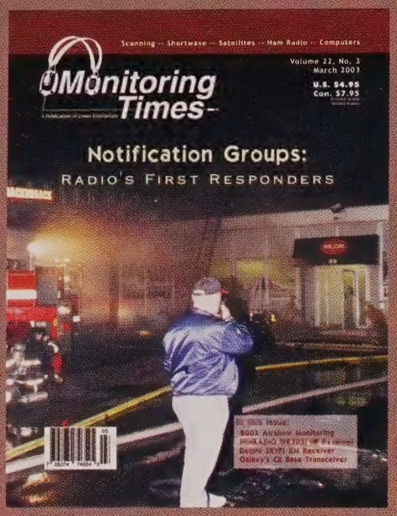
Monitoring Times

Vol. 22, No. 3 March 2003



Lead Story

Notification Groups

By Michael Coppola

A permanent part of the scanner scene today is the notification group, dedicated to notifying its members whenever a newsworthy incident occurs. The news may be spread by two-way radio, pagers, e-mail or web sites, but the originating source is always someone listening to a scanner. This service is much more than a hobby: These groups notify the media and other public safety organizations who may not have the time or the aptitude to monitor radio frequencies for themselves.

The author is a member of two notification groups, and explains in general terms how they operate. Look for a group in your area! Story starts on page 10.

On our cover: Metro Fire Radio Unit 30 provides an on-the-scene update from a recent Hackensack NJ 3rd alarm fire. (Photo by Michael J. Coppola)

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Provincetown Pilgrimage 12

By Bob Fraser

March may be a little too chilly to think about making a sight-seeing trip to Cape Cod, so just hang on to this article until summertime. Meanwhile, Bob Fraser's profile of the radio landscape in Provincetown is a great demonstration of how you can make use of any trip to a new location to further your knowledge, enter more loggings, and just plain have fun with your radio(s.)

They Put the SAM in Uncle Sam 16

By Ron Perron

Special Air Missions, or SAM flights, take place nearly every day. These are the planes and helicopters that transport our VIPs around the country and abroad. It can get confusing, because the callsign changes according to the mission and who's aboard. Here to straighten it all out is our author, who lives within earshot of Andrews Air Force Base, the hub of most SAM flights.

Namibia - Land of Diverse Beauty 18

By Colin Miller

The country formerly known as South West Africa has been late in developing broadcasting, but its strides have been rapid since achieving a hard-won independence in 1990. Broadcasts in English, German, Afrikaans, and several native languages can be found on domestic FM and shortwave radio. Plans for digital broadcasting are already on the table.

Roberto Galletti, Neglected Radio Pioneer 20

By Michel Berlie-Sarrazin

Marconi became such a dominant figure in communications, that other noteworthy experimenters of his era have nearly been forgotten. One such person is Roberto Galletti, who at one time was poised to transmit communications from France to America with an emission strength which rivaled any other. Though he was outmaneuvered in that field, he went on to make valuable contributions in the field of radio-navigation.

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Reviews:

"For the first time in consumer electronics, the shortwave listener can tailor his receiver to his own requirements," cheers Bob Grove. Check out his review of the WiNRADiO WR3031 software defined shortwave receiver on page 82. Ken Reitz is equally enthused over Delphi's SKYFi XM satellite radio system. Best of all, he says, "satellite radio is no longer just for the road." (p.84)

New offerings in base stations for Citizen Band radios have been few and far between in recent years. But Galaxy has come up with a winner in its new CB base station – "The Galaxy DX 2547 can go toe-to-toe with any other CB I've ever owned," says reviewer Jock Elliott (p.87).

For those folks who took advantage of Radio Shack's recent sales on the PRO-92 and PRO-2067, Bob Parnass has written open source software which can program settings and frequencies via your computer (p.78). John Catalano takes a look at software that's out of this world – Radio-Jupiter Pro is designed to make it easier to tune in the planet Jupiter – Now that's DX! (p.80).

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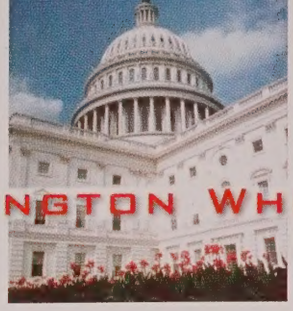

WASHINGTON WHISPERS

Fugitive Radio Operator Arrested in NC

Steve Anderson, 55, of Somerset, Kentucky, a right-wing extremist pirate radio broadcaster and former member of the Kentucky State Militia, was arrested in southwestern North Carolina after eluding authorities for over a year. He previously held the Extra Class AA8DP Amateur Radio call sign.

A tip received following a November 2nd Fox television episode of *America's Most Wanted* and forwarded to federal officials led to his arrest. It was the second time that the show had featured Anderson, an alleged racist and anti-Semite accused of talking about killing federal law enforcement officials on the unlicensed radio station he operated from his home. (See April 2002 *MT* for background story.) Fox-TV first covered the case in April 2002.

Anderson is the former operator of the clandestine KSMR (Kentucky State Militia Radio) and a man on the FBI's most wanted list. He was arrested by officers of the Federal Bureau of Alcohol, Tobacco, and Firearms and the North Carolina State Bureau of Investigation.

Anderson is accused of shooting an automatic weapon at an off-duty Bell County sheriff's deputy on October 14, 2001; the deputy had pulled Anderson's truck over for driving his pickup with broken tail lights. The officer saw a magazine to a gun in his cup holder and asked if he had any weapons. At that point, according to authorities, Anderson stepped out of his vehicle and opened fire with an AK-47 at the officer and his patrol car. The officer was unharmed although his cruiser was struck about 25 times.

Police said Anderson then drove his 4-wheel-drive Kentucky Militia truck into the Eastern Kentucky mountains. When authorities found the truck abandoned the next day, they discovered a pipe bomb and ammunition in it. A search of his home uncovered a huge arsenal of explosives, ammunition and guns. He was indicted on federal weapons charges after his extradition back to Kentucky.

The Radio Connection

Anderson had attracted FCC attention two years ago when he operated an unlicensed HF station as part of the Kentucky State Militia ...a group of armed extremists who oppose the powers of the federal government. He supposedly was a Major in KSM's 6th Battalion. KSM was headed up by "State Commanding Officer" Charlie Puckett of Nicholasville, Kentucky. Under his influence it became one of the most active militias in the country.

In December 2000, the Federal Communications Commission cited two Amateur Radio operators, Charles Puckett, KF4ZMF, and Stephen Anderson, AA8DP, for operating on high frequency spectrum that was not authorized by their ham radio licenses. Their radio activities had been under investigation since they were using ham and other frequencies for their tactical communications and broadcast needs.

The FCC censured Puckett for operating on 80 meters (3.860 MHz), a frequency not authorized to Technician Class licensees. Puckett denied the violation, stating that the transmissions were under the "control" of Stephen Anderson (AA8DP) – who, as an Extra Class ham operator, is licensed for operation on that frequency.

Anderson was also warned by the FCC in December 2000 for his operations just below the 40-meter ham band on 6.890 MHz, a frequency not authorized to Amateur Radio at all. Puckett denied monitoring reports that the KSM or its members were involved in the alleged transmissions on 6.890, which reportedly jammed WWFV, a licensed commercial shortwave radio broadcaster then operating out of Copperhill, Tennessee.

On January 24, 2001, FCC enforcement agent Riley Hollingsworth sent a letter to Anderson asking if he was in control when Puckett operated on 3.860 MHz.

Anderson responded by returning his Amateur Radio license to the FCC claiming that the agency "...is an agent of a foreign corporation" with no authority over his radio operation. He also stated that he does "...not reside in any territory or possession of the Federal Government of the United States of America..." and that he was "...not subject to any regulation by this fictitious entity."

On February 12, 2001, Hollingsworth obliged by canceling Anderson's AD8DP Extra Class license.

Anderson then launched unlicensed KSMR (Kentucky State Militia Radio) on March 3, 2001, and broadcast nightly on 3260 kHz USB between 0300 and 0400 UTC. Anderson announced during a broadcast on Friday, March 9, 2001, that he had received another letter from the FCC, presumably for his transmissions as KSMR. He said there is no point in citing him. "This is the Kentucky Militia station.... We don't want to hear from you [because] you don't have anything to say to us. You don't have any authority over us. We are asserting our First Amendment Rights here and are protecting them with the Second Amendment." The Second Amendment, of course, refers to the right to bear arms. Strong words indeed.

Anderson said that KSMR was operating at 800 watts and was in the process of adding a 3kW amplifier he called "the rock crusher." He also said that the station would soon operate full time on 3260, 6880, and 12181 kHz, but that programming never materialized.

The FCC took KSM's defiance seriously and was planning to close the station, levy a minimum $7,500 fine and seize the transmitting equipment.

Anderson was scheduled to teach a seminar on communications and antennas to members of other state militias who would be attending a "major" multi-state patriot rally scheduled for April 2001 at Norm Creek, Kentucky. KSM Commander Puckett became uneasy about a confrontation with the federal government and ordered Anderson's unlicensed HF broadcasts – many of which threatened violence – to stop. When they didn't, Puckett dismissed Anderson from KSM.

Three days after Anderson shut down KSMR, he returned to the pirate airwaves as the United Patriot Radio supposedly representing all militias across this country.

Anderson was arrested in North Carolina on November 22, 2002, and was indicted in London, Kentucky. If convicted, Anderson faces a maximum penalty of life imprisonment and a $250,000 fine.

Puckett was also arrested on federal weapons charges shortly after completing an interview in Lexington, Kentucky, about Steve Anderson for the television show *Unsolved Mysteries*. A nine-count federal indictment accused him of possessing various guns, pipe bombs, and ammunition in violation of federal law. In a plea bargain, he was sentenced August 29, 2002, to 30 months and one day in prison on federal weapons charges.

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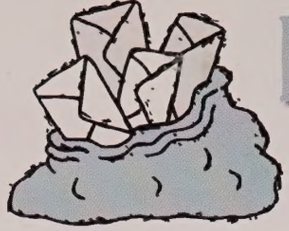

LETTERS TO THE EDITOR

What's the Law?

State and regional laws vary regarding what you're allowed to listen to, where you're allowed to listen, and who's allowed to listen. These local laws may change over time without listeners realizing it. Jorge Rodriguez, a lawyer who has written on the legal issues of listening in previous editions, will be running a regular column to update and hopefully clarify some of these issues, and to advise of changes or proposed changes to existing legislation.

However, like all our writers, he needs your input! To kick off the column, send news of pending legislation, the URL for your state's radio laws, examples of hobbyists harassed for scanner possession, or your questions to JR@INDYLAWYER.COM. You can also write to Jorge Rodriguez c/o *Monitoring Times*, 7540 Hwy 64 West, Brasstown, NC 28902.

Satisfied Satellite User

"In the January 2002 edition of *Monitoring Times*, Ken Reitz wrote an article entitled 'Sky Wars' which took a look at the new technology of satellite radio, and what it has to offer us as consumers. I answered the article with a letter to the editor, which was printed in the March 2002 issue. Well, it's been a year now since I purchased my radio, and I thought there might be some interest in an update on how this new technology is working for me.

"My overall enthusiasm for this product has not diminished in the past 12 months. If anything, it has only gotten stronger. By the way, I chose to subscribe to XM Radio. I cannot offer any input about Sirius Radio, but I hear that it offers much the same type of quality and programming choices. In late August, XM Radio changed their line-up, and one of the channels added was Old Time radio. What a perfect format for this medium! I have been parked on that channel about 90% of my listening time since its introduction. I also enjoy listening to jazz, comedy, rock, holiday tunes, news, financial information, the BBC, and sports.

"My only problem this past year with satellite radio was that I had it installed in my car, and I would constantly find myself enjoying a particular program when I arrived home, where I had to turn the radio off before the program ended. The home units offered at the beginning of 2002 weren't units that I liked, so I didn't buy them. That changed recently with the introduction of what I believe takes satellite radio to the next level. It is a truly portable receiver developed and marketed by Delphi. It's called the SkyFi, and it is an XM Radio receiver that is about the size of a remote control, and is loaded with a number of useful features.

"The quality of the service itself has not diminished, either, in the past 12 months. Signals have remained reliable, and I've gotten good service almost everywhere I've gone (tunnels and parking garages excluded), even in the Rocky Mountains west of town.

"The only drawback to this new technology remains the cost of the receiving equipment and the monthly subscription fee. This may turn a number of people off, but for me the service has been so good that I seldom listen to AM or FM radio anymore. All in all, I've found that satellite radio has lived up to all of my expectations. In fact, I've enjoyed it so much, I've added the Delphi unit to my home, and purchased two SkyFi adapters so I can enjoy the service in my den and family room. This is one investment that has truly brought me a great many returns over the past few months. I hope that it enjoys a long and bright future."

– Jeff Weinberg, Denver, CO

MT's review of the SkyFi receiver on page 84 agrees with Jeff. Check it out!

Railspotters Encounter

"I have been a longtime railfan and New Orleans St. Charles Line streetcar buff. I've photographed the streetcars day and night since about 1970. On many occasions, I and several of my rail nut friends would be invited into the Willow St. Carbarn to photograph at will. For the last eight or so years, I've been spending several days in New Orleans at Christmas time. During my visit in December 2002, a supervisor saw me outside the barn and invited me in and showed me where the new cars are being manufactured. When I stuck my head in the door I was invited in and told to take all the pictures that I wanted.

"This year was totally different. As I was setting up my tripod on the sidewalk the watchman told me 'no pictures, no pictures.' I questioned his authority and reason but he continued to say 'no pictures.'

"I moved across the street and set up, then a 'supervisor' came out, got into his truck and parked it in front of me. He gave me hell for ignoring the watchman. When questioned as to the reason, all he could say 'they don't want any pitchers.' Who is they? No pitchers period. How about on the street. 'No pitchers anywhere.' Then he threatened to call NOPD, so I left. I had already shot three rolls of film on Canal St.

"After stewing the night, I got up the next morning and read in the paper that the new mayor went through the RTA Board with a dose of Exlax. Politics as usual in New Orleans. So I wrote the mayor advising him of the treatment and asking a reason for it. No response yet.

"As for NOPD? Well, I was a cop in Mobile for 18 years and I'm vaguely familiar with the level of intelligence (or lack of) of the police in that section of New Orleans. They fell out of the trees, anthropologically

Oh, I have slipped the surley bonds of earth, And danced the skies on laughter-slivered wings... And put out my hand and touched the face of God.

- High Flight

- John Gillespie MaGee, Jr.

Our deepest sympathies to the NASA and Astronauts' families for your loss. Seated in front: astronauts USAF Col. Rick D. Husband (left), mission commander; Kalpana Chawla, mission specialist; and U.S. Navy Commander William C. McCool, pilot. Standing (from left), astronauts/mission specialists: U.S. Navy Captain David M. Brown, U.S. Navy Commander Laurel B. Clark, USAF Lt. Col. Michael P. Anderson, and Israeli Air Force Colonel Ilan Ramon. (Photograph courtesy of NASA).

speaking, last week. They discovered fire yesterday. The PD in downtown and the French Quarter are quite different."

– Tom Trott, Mobile, Alabama

Lowband Listening

"I've got a little Sangean ATS 818 which I hook up to a simple 100-ft antenna terminating in my greenhouse. While my primary interest is MW DX, I've also picked up beacons 'Below 500 kHz' from time to time when nothing of interest was happening at 530-1710.

"I've just spent a fruitless [relatively] hour or so on the 'net seeking identification for some of these little low-power rascals. Managed to identify two of the first 14. Bummer.

"Needless to say, my $12 [for Kevin Carey's *Beaconfinder* book] will be in the mail this very morning. Thanks in advance for publishing an identification list. And ongoing thanks for a delightful monthly column in *Monitoring Times*.

"[I just noted that the columns always appear at the same page number in each issue. Duh!]

- Kilohertzianly yours, Jim Hannah, Tottenville, NY

Thanks, Jim, for the compliments on the lowband column; we agree! As for placement, columns occasionally are moved around a little, but we do try to be consistent!

Coro at Kulpsville? No Way!

Regarding *MT*'s note about Cuba's ham radio host Arnie Coro being invited to the SWL Fest March 7-8, we received this note:

"*NY Times* 1/6/03: Cuba has an aggressive and effective intelligence service that has hundreds of agents in the USA. Page 3 of Northeast Edition. Check it out.

"(Arnie Coro is one of the "inner circle" in Fidel's government and has been for over 40 years.)"

– CD Fairleigh, Retired Intelligence Analyst, Washington DC

You'll be interested to know Coro is unable to attend this year's Fest, due to insufficient time to complete government paperwork.

Happy Associations

"I would like to express my thanks for your products, outstanding customer service, and promptness of delivery. My association with Grove Enterprises dates back to 1982, I was in the Army (Communications Tech) and had just returned from a tour in Turkey. While there, I had heard rumblings of a new periodical for the swl/scanning enthusiast, but because of the isolated nature of my post, I could not follow up.

"Once stateside, I quickly became a subscriber, and as I would travel overseas, *Monitoring Times* became my reference companion, often raising the ire of my commanders, some of whom became enthused once they read the magazine. My service is long over, yet I still subscribe to *MT*, and buy from Grove exclusively. I recently purchased an 895XT and an AOR 8600, and I am extremely satisfied with them. Thank you very much for the excellent service, a terrific magazine, and the kind help I receive when I call."

– Ed Hutton N3KEX

"I just subscribed to *MT Express* and the instructions you sent were flawless! Worked great.

"*MT Express* is very convenient and allows me to interact with the publication in ways I couldn't with the paper version. I can also print out what I want (like the frequency skeds, etc) and not have to lug around the rest of the magazine! :) I'm not trying to 'put down' the paper version at all... *Monitoring Times* is still the defacto monitoring publication. However, *MT Express* works the best for me. Thanks for providing such an innovative product!"

– Larry Spinner, Satisfied Reader

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to ***Letters to the Editor,*** 7540 Highway 64 West, Brasstown, NC 28902, or email *editor@monitoringtimes.com.* Letters may be edited for length and clarity.

Happy monitoring!

-Rachel Baughn, KE4OPD, editor

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Radio Honor Roll

Plumber and MetroAlert Share Honors

As Thomas Ranney was leaving a bank in Westerville, Ohio, he held the door open for the customer behind him. Outside, however, he noticed a billow of red dye from the man's jacket pocket. When the man, William Caslin, took off in his pick-up, Ranney followed, while calling 911 on his cellular phone. Ranney described Caslin, his truck and his license number to police, who confirmed the bank robbery.

Ranney stayed on the phone with one dispatcher while another activated MetroAlert, the emergency radio frequency that connects all 23 public-safety dispatching offices in Franklin County. Cooperation between districts resulted in Caslin's capture.

"It worked exactly the way it was supposed to," said Holly Wayt, Westerville communications manager. "It was the first time that MetroAlert has been in on the action from the beginning to the end." One member of the oversight committee said, "This is the first real success story. People started reacting and going to key places, and it paid off."

Ranney, who works as a plumber, also received high praise from detective Dietz who said, "I'm not sure some police officers could provide as good information as he did."

DW: Facelift or Cutbacks?

Some major changes will be in effect from Deutsche Welle beginning March 30. DW's press release touts the changes as a major facelift. For example, daily news bulletins will be increased from 13 to 24. *Newslink*, the flagship current affairs program, will be broadcast round the clock, targeted to its audience. There will be three live editions of *Newslink* for the Asia-Pacific region, two for Africa, with repeats, two for North America and two for Europe every weekday.

But don't expect to hear it on shortwave in North America. Shortwave broadcasts to the "highly developed media markets" of North America, Australia and New Zealand will be terminated March 30. DW says it will focus on expanding the number of radio stations which rebroadcast DW's radio programs, like Canadian Broadcasting Corporation or ABC New Radio. Listeners will still be able to hear DW via satellite or over the Internet at http://www.dw-world.de/English.

DW also plans to introduce digital shortwave transmissions to East Asia and Europe with analog shortwave transmissions for Asia and Africa continuing for the foreseeable future.

The press release finally admits, "These restrictions have become necessary against the background of financial cut-backs for Deutsche Welle."

The Billboards are Listening

Electronic billboards in the Bay Area and Sacramento are being equipped to detect which radio stations are tuned in by passing cars and then instantly access a vast databank of information about the people who typically listen to those stations. The electronic ads will then change to fit listener profiles.

The "consumer monitoring system" developed by Mobiltrak of Chandler, Ariz., picks up radio waves "leaked" from the antennas of up to 90 percent of all cars passing by and pinpoint the stations being played. Each station has a typical listener profile derived from detailed consumer surveys. The system will assess the most popular radio station during a given hour and target the ads to those drivers.

A complete Mobiltrak system might include billboards along a several-mile stretch of freeway. The first billboard's receiver would collect data on a block of cars and send it to the billboards farther on, which would then switch to the appropriate ads.

One resident expressed the view that everyone should turn off their radios "until they let us have our privacy back," but privacy experts are not particularly worried about the new billboards, as long as people remain anonymous.

Mobiltrak said the technology doesn't have the ability to listen to people's conversations or CD players. The technology is designed to be anonymous and passive, and relies on information about large numbers of drivers. That might foil the scheme of our *MT* contributor, who said if he lived in that area, he would be tempted to put a cheap radio under the billboard and tune it to the same station all day long!

Glad We're in America

A French radio hobbyist who posted frequencies used by the French military and police on the Internet is to be put on trial later this year for violating national security.

Vincent Plousey admitted he had been "too curious, naive and immature" but insisted he had "never sought to make money nor to undermine my country" by publishing the frequencies and said the whole affair had been blown out of proportion.

"I was a person fascinated by radio communication. I simply wanted to share my passion," he said, adding that "a good number of the frequencies" divulged were freely available in documents held in public libraries.

A source close to the case said an investigating magistrate had ordered the trial at the end of December. A date had not yet been fixed, but it should take place by mid-2003, he said.

The French interior ministry had raised the alert after coming across Plousey's web site.

VLF Antarctic Antenna

A new antenna has been erected in the South Pole, but this one isn't about communications for the remote outpost nor is it involved in Antarctic studies. The antenna is intended to study the mesosphere and lower atmosphere – a section which is largely ignored because it's too high for airplanes or balloons, but too low for satellites. Umran Inan, head of the Very Low Frequency Group of the Space, Telecommunications and Radioscience Laboratory at Stanford University, says the only way to measure these layers is by passing very low frequency electromagnetic waves through it. Such waves are generated naturally by events such as lightning strikes, but the transmitter at the South Pole – where there are no thunderstorms – allows for more controlled observations.

Umran Inan is paying attention to this section of atmosphere, hoping transmissions from the massive 4-mile long antenna will allow better detection of problems such as satellite-damaging disturbances caused by solar activity. "The weather in space is very, very important for our technological age now, because we have so much of our assets in space," Inan said. The highest energy electrons can also penetrate as low as 25 miles (40km) above the Earth, where they can "wreak havoc in the atmosphere, ionizing chemical species, creating x-rays and perhaps influencing the chemistry that produces ozone," he noted in a summary of the project.

BULLETIN BOARD

March 7-9: Kulpsville, PA
16th Annual Winter SWL Festival, Best Western - The Inn at Towamencin, 1750 SumneytownPike (215-368-3800). Forums on a variety of radio topics, banquet, prizes (grand prize is a Ten-Tec RX-350DSP receiver), raffle, fun and fellowship. For registration form and info go to http://www.swlfest.com or write SWL Winterfest, PO Box 4153, Clifton Park, NY 12065. Full registration $50.

March 9: Amherst, MA
MTARA 18th Annual Hamfest at Amherst Regional Middle School (170 Chestnut St), 9a.m., adm $5, talk-in 146.940 and 145.130 (PL 123 Hz). Vendors, tailgating, prizes, snack bar, handicapped accessible. For VE testing contact Dave Cote WA1DC, wa1dc@arrl.net preregistration advised. Commercial license testing also available; contact Steve N1SR at 413-593-6554 (leave name, phone #, and desired license). For info contact Bob Meneguzzo K1YO, k1yo@arrl.net or 413-569-0320. MTARA, PO Box 3494, Springfield, MA 01101-3494

March 15: Marietta, GA
50th annual Kennehoochee ARC hamfest at Jim Miller Park (Callaway Road), 8a.m.-4p.m., adm $5, talk-in Fri and Sat 146.880(-) (PL 100). Vendors, demos, emergency services expo with hi-tech Mobile Command Units, Hazmat units and more. VE exams, 9a.m.. Also, one day no-code tech session 8:30a.m.-5p.m., take the test at 5:30p.m. ($35). Visit http://qsl.asti.com/hootch/KARC-HamF.html.

March 22: Brampton, Ontario
Ham-Ex 2003, Sponsored by Peel A.R.C. & Mississauga A.R.C., at the Brampton Fall Fairgrounds (Hwy 410 north becomes Heart Lake Road; Continue 7.5 km (4.6 mi) to Old School Road. Fairgrounds on SW corner.) 9 am to 1 pm, adm $C 6.00, Talk-in: 146.880 (-) & 145.430 (-). Manufacturers, vendors, new and used radio/computer/electronics. Exams (Basic, Advanced & CW), DXCC Card Checking. Seminars, Exhibits & demonstrations, Gala Banquet & Prizes. Guest Speaker - Jim Dean, V.P. Radio Amateurs of Canada. For info, Website: http://www.peelarc.org, E-mail: ham-ex@sympatico.ca, Phone: Victoria 905-846-0822

The signals produced by the South Pole VLF beacon transmitter will be received at Palmer Station and coastal Antarctic stations of other countries, providing a scan of the ionospheric regions it passes through. The frequency needs to be in the 10 to 25 kilohertz range so the wavelength will bounce off the mesosphere and lower ionosphere. The South Pole beacon started transmitting in January. It operates for one minute out of every 15 minutes, using 5 to 6 kilowatts of power.

Receiving the signal doesn't require a large antenna – the one at Palmer is 30 feet tall – but it must be away from electrical interference. The signal will also be picked up at the Automatic Geophysical Observatories (AGOs) on the plateau and at receivers being built at stations belonging to other countries in all directions across the continent.

Nextel pursues spectrum swap

For more than a year, Nextel Communications Inc. has been lobbying the FCC to realign the 36 MHz of land mobile radio spectrum at 806/824 – 851/869 MHz so that public safety, private radio, and Commercial Mobile Radio Service are no longer comingled – similar to the plan the FCC adopted for the 700 MHz band. Despite large expenditures of time and money, the problems of interference on police and fire department networks from higher-powered CMRS systems have gone largely unresolved. Since Nextel has bought up nearly all the independent operators in this spectrum, it's using its position to strike a bargain it says will benefit all parties.

Most recently, Nextel indicated it would raise its offer to $850 million to help upgrade public safety communications to make the move. In return, they are asking the FCC to (1) create a new digital advanced Specialized Mobile Radio channel block at 816/824 – 861/869 MHz; (2) assign to Nextel licenses for the 6 MHz of spectrum (the current public safety channels) in the new advanced SMR channel block; and (3) assign to Nextel licenses for a contiguous 10 MHz of Mobile Satellite Service spectrum at 2.1 MHz reallocated for terrestrial commercial mobile use.

Critics say the swap plan may solve many public safety interference problems in the U.S., but the spectrum Nextel is requesting in the new wireless technology frequencies may be unfair to the rest of the mobile wireless community.

As a side note, Nextel has had the FCC designate it out of the Private Land Mobile Service and into the CMRS as a cellular provider, so it is illegal under ECPA 86 modified to monitor Nextel digital communications – even if you could.

Poptronics, RIP

According to a contributing editor, Gernsback Publishing and *Poptronics* magazine ceased to exist as of mid-December. *Poptronics* was formerly *Popular Electronics* and *Electronics Now* magazines. Bob Grove reminisces, "Larry Steckler is the one who got my name out as a writer, helping me to where I am now. They were the ones that issued the 'WPE...' call signs to their SWL readers through their columnist, Hank Bennett. It's inevitable, I guess; with the dominating plug-and-play mentality, no one is really interested in what's inside the box anymore."

MT Writer Honored by ARRL

Ian Poole, G3YWX, is the winner of the 2002 Bill Orr, W6SAI, Technical Writing Award, which is sponsored and administered by the ARRL Foundation. Poole was chosen as the award's first recipient on the basis of his article "Understanding Solar Indices," which appeared in September 2002 *QST*. Ian Poole has written several articles for *Monitoring Times* which help explain various radio specifications; they are also available to readers in the reference section at http://www.monitoringtimes.com

"Communications" is compiled by editor Rachel Baughn from news and clippings from our readers. Many thanks to this month's contributors: Anonymous, Albany, NY; Kevin Klein, Neenah, WI; Sterling Marcher, La Mirada, CA; Bill Mullowney, Everett, MA; Ed Muro, Mineola, NY; Carmen Risher, Perris, CA; Doug Robertson, Oxnard, CA; Brian Rogers, Melvindale, MI; R.A. Sklar, Seattle, WA; Georger Speck, Ft Worth, TX. Via email: Bruce Blackburn, DP Dunn, John Figliozzi, Maryanne Kehoe, Ed Muro, Jerry None, Ken Reitz, Larry Van Horn, Barry Williams, Larry Zamora. Thanks also to ARRL, Mobile Radio Technology, and Scan-L.

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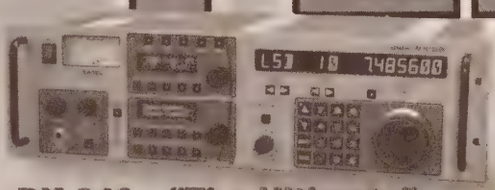

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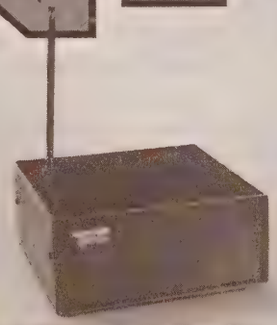

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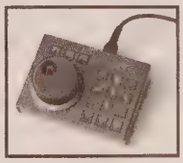

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Notification Groups

Story and photos by Michael J. Coppola

If you're a person who's involved in scanning, and more specifically, scanning emergency services, then notification groups could be an important part of your everyday monitoring. Years ago, when notification groups started to become popular, there was only one type of group: two-way radio. Most groups were started by people interested in radios and they usually were also involved in emergency service such as a fire department or emergency medical service (EMS).

Today, you can find radio groups, pagers, e-mail, web sites, and a whole host of methods to obtain your information as it's happening. The concept of notification groups, no matter what the format, is very simple; rebroadcast emergencies from the radio or from what you see at a scene to your members.

Members of these groups are comprised mostly of public safety personnel, members of the press, and investigative agencies such as arson or fatal accident teams. In many instances, it has aided in relations between the media, public safety agencies, investigators, freelance photographers, and potential witnesses.

Overturned auto in Totowa NJ with minor injuries.

Two-Way Radio

First, let's start with what I consider still the most reliable of them all, the two-way radio group. Most groups are made up of a small number of members and therefore cannot afford to purchase their own frequency, repeater system, and site for the antenna. The simplest solution is to rent "space" on a community repeater (usually on commercial band frequencies) that a local radio shop may own.

The most common frequency band for this is UHF (450-512). Very often notification groups will operate on the same frequency band as a busy city agency so members only have to carry one radio. (For example: Boston FD is on 480 MHz and Boston Citywide Radio Group is also on 480 MHz.)

To give you an idea of how an incident would be handled, here is a typical example of a house fire in a local city we cover. Say a member ("unit 1") hears the report of a fire in Hackensack, 123 Main Street, with several calls. Unit 1 would transmit over the group's main frequency, "Units may want to monitor Hackensack, multiple calls on a house fire on Main St."

This is very common practice. It allows people to pay special attention to that town's frequencies. It also aids members who may be driving around in the area to start heading in the direction of the incident. When a unit from the fire department confirms a fire, Unit 1 will then transmit "Working Fire in Hackensack, 123 Main St, first due unit reporting..."

Everyone has his or her own personal enjoyment of the system. Some members prefer to just acknowledge other units and monitor the action from their home. Other members enjoy responding to the scene and giving reports. Standard reports include town, address, building size-up, condition of fire, and whether radio members coming to the fire should continue in to the scene or cancel because the scene is downsizing. Other incidents would include information relative to the nature of the incident, such as persons transported or extricated at a serious motor vehicle collision.

The radio system I belong to, Metro Fire Radio, is extremely active during the "rush hour" times in the morning and afternoon. With over 100 members and two full time aviation units, it's hard to miss a beat. Of those two full time aviation units, one is for a major New York City news stations, CBS. "Aviation 2", as he is IDed on our system, is constantly exchanging information with members on the ground. This helps him respond to incidents much more quickly. For example, people who are already at the scene can provide nearby landmarks for him to see from the air. Additionally, members who are already at the scene can provide accurate information for Aviation 2 that might not be available from public safety radio. This information is used "on the air" to viewers at home watching the news.

Sensitive information such as names, cause and determination, ongoing police activity, etc., are not put on the radio for obvious reasons. As I stated, "buff groups" as

Mid-air plane collision in Fairfield NJ

Metro Fire Radio member Joe Ramicio - Unit 413 seen providing CPR to a victim removed from a house fire until emergency personnel could arrive.

we're referred to by the public safety community, have an unofficial relationship with most of the members in their area, so they try to work together with information distribution and not to step on anyone's toes. This provides a better working relationship for future events.

Paging Systems

One of the more advanced types of notification system is the pager. This has been around for a while, but not as long as the radio systems. A notification paging system is based on "dispatchers" – some groups call them "reporters." First, you need a paging carrier. Today, all large cities in the United States have one, if not several, paging carriers that offer alpha-numeric paging services. Next, you need people who can monitor incidents on scanner radios, and then retype them into computer programs designed for text messaging.

Members of the Box-54 Canteen unit, who rely on information provided by Metro Fire Radio, seen here evaluating a multiple alarm fire in Hackensack NJ.

What these text messaging programs do is take information typed by the "dispatcher" and send it into the paging carrier's system, whether it be via e-mail, dial-up modem, or SNPP format (like e-mail). The paging system then takes that information and sends it out to the customers' or subscribers' pagers. Each type of incident has a certain code assigned to it. This way, the systems know which pager ID to send the information to.

For example, if a dispatcher hears a shooting in town A, he would type the information into the program. He would assign it the "police" code. The paging carrier receives the text on the "police" code and sends it to the pagers. Once the pager receives the signal, it automatically assigns it to the "police" group.

How do the pagers have groups, you ask? Well, the pagers used today have what are called "mail drops" or "cap codes." It's as if you had a pager with 10 or 15 pager numbers assigned to it and each one made a different sound when it came over your pager.

Paging groups, such as Emergency Action Network in New Jersey, can now also send these incidents to your e-mail. Several subscribers of EAN have set up a special e-mail address just for receiving the incident notifications. As a matter of fact, several large media groups in the New York/New Jersey area have the same set-up so their reporters can get the information right at their computers.

This type of notification group or system has some advantages. You don't have to listen to the radio. You can get your information almost anywhere. You can save the messages on your pager, and dozens of other useful applications.

It also has its drawbacks. At times, there is a delay of several minutes to get the information, whereas you can hear it as it's happening right off the radio group. You can't interact with a pager like you can with radio group, and therefore can't ask specific questions to a unit on the scene regarding the incident.

Notification groups have become a recognized and reliable source of information. As a survivor of the World Trade Center collapse (see *MT* Nov 2001 cover story), I can tell you that Metro Fire Radio kept me and my partner Dave in communication with members of our notification group when all else failed at ground zero that morning.

If you are a person who monitors radios and would like to do something with the information you hear, look into a notification group in your area. If you need assistance finding one, please feel free to contact me via my web site.

A suspicious fire in the Passaic County Jail forced the closure of several city blocks and evacuations of prisoners to other facilities.

About the Author:

Michael J. Coppola is a Police Officer for the Palisades Interstate Parkway – NJ Station, volunteer firefighter for West Paterson NJ Fire Department as well as an NJ EMT-B. Active member of APCO and an instructor for the FBI and NJ State Police Criminal Computer systems. Member of the Metro Fire Radio Board of Directors and Dispatcher for Emergency Action Network Paging. For more information, visit: **http://www.metrofireradio.com** and **http://www.ean-inc.com**

Some Selected Notification Groups

Boston Citywide	Radio Group	Massachusetts
Citywide Radio New York	Radio Group	New York City / New Jersey
D.C. Citywide	Radio Group	Washington D.C. area
Firecom Radio	Radio Group	New Jersey
Hartford Citywide	Radio Group	Connecticut
Jersey Coastal Emerg. Serv.	Radio Group	New Jersey
Metro Fire Radio	Radio Group	New Jersey / New York City
New London Citywide	Radio Group	Connecticut
Northwest Emerg. Comm.	Radio Group	New Jersey
Providence Citywide	Radio Group	Rhode Island
CFP	Paging Group	South Carolina
Emergency Action Network	Paging Group	New Jersey / New York City
FirePage Ohio	Paging Group	Ohio
HNAN	Paging Group	GA
NEFNN	Paging Group	Mass
PPS Paging	Paging Group	New Jersey
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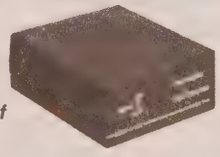

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Provincetown Pilgrimage

By Bob Fraser

Radio is my traveling companion. I never go anywhere, even to work, without one. However, my equipment is quite modest, even going for a long stay. Right now, I am using a SONY ICF-SW100, a Grundig YB-300PE, and a Radio Shack PRO-46. These three cover nearly the whole radio spectrum from the lowest long wave to the highest UHF signals. In addition are: a simple wire antenna, ear buds, small notebook with pencil, extra batteries, and, most important, a homemade frequency/program list.

In planning a trip, I do considerable research as to what I shall expect to see and hear. I have found that even the most mundane place is awash with radio signals so, if the urge hits, I am never disappointed. I do limit my radio listening to short periods, some evenings, and rainy days which usually appear. To merely stay in a room at a vacation spot listening to the radio the whole time, seems to me a crime. One might as well stay at home – there is so much else to see and do.

I have been to a number of places not too distant from my home town of Cohasset, Massachusetts, and one of the most interesting I have found is Provincetown, Massachusetts – "P-Town," as it is affectionately called – at the very end of Cape Cod.

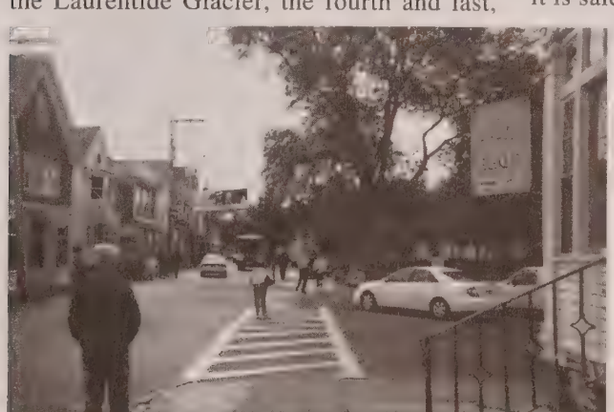
A Bit of History

The present Cape Cod was created by the Laurentide Glacier, the fourth and last, some 15,000 years ago. Remnants of an earlier Cape Cod can still be seen, notably the Clay "Pounds" or Highlands at Provincetown's neighbor, Truro.

The Cape was originally covered with trees but in the 19th century, almost all were harvested to make great shallow pans where seawater was evaporated by the sun's rays to make salt, primarily for the state's fishing fleets. Once the forests were gone the sand began to drift, changing the landscape. The most notable example is the big freshwater Pilgrim Lake, once part of Provincetown Harbor and, therefore, saltwater. The fight to control erosion continues to the present, and more and more areas of sand are closed to the public each year. The battle seems somewhat successful, as the vegetation has increased immeasurably in recent years. There is even talk of opening Pilgrim Lake to the sea again.

The first people here were the Nauset Indians several thousand years ago. Around 1000 A.D., Vikings visited. A wall, said to have been built by them, is enclosed in a house at "P-Town." The later Pilgrims discovered an ancient grave nearby and noticed red and blond hairs on the skulls.

Next were the Basque and Portuguese fishermen, who were working these waters, it is said, even before the birth of Columbus.



Often overlooked by history is the fact that the Pilgrims landed here first before moving onto Plymouth across the Bay. A 252-foot Italianate stone tower built in 1907-1910 at the town's center now makes sure that this First Landing is never forgotten. Imagine DXing at the top of this shaft with a handheld scanner or ham rig!

Around 1880, artists "discovered" this town and it became America's largest art colony. More recently, it has also become a gay community and a home for Jamaicans. All of these different groups with their unique cultures have created a very rich flavor to Provincetown.

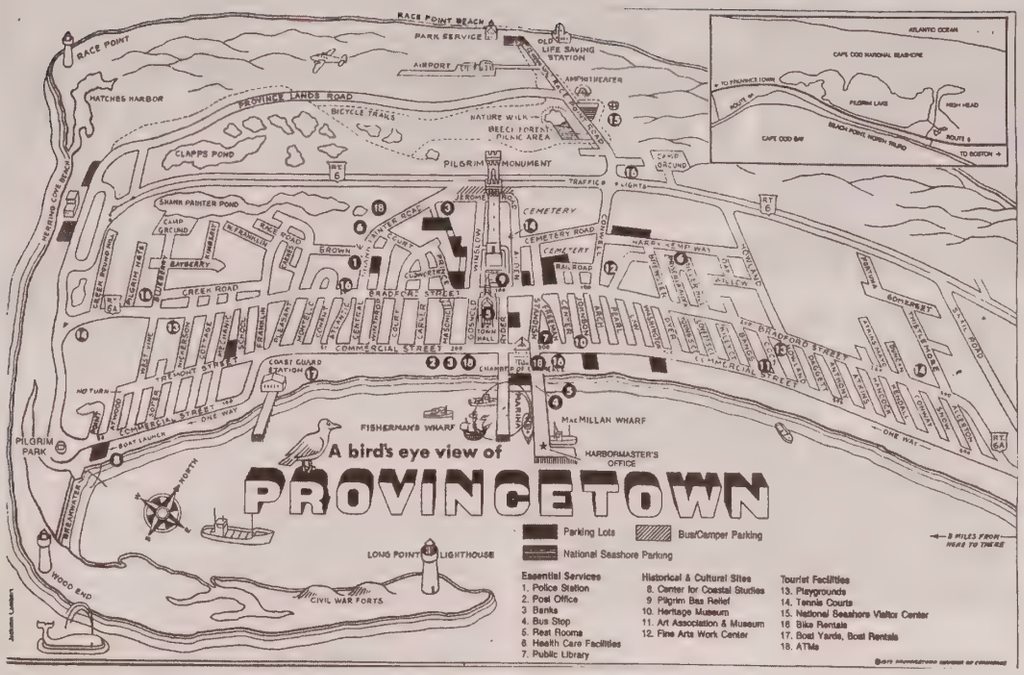
How to Get There

The easiest way is by car. Just come over the bridges at the Cape Cod Canal and travel 64 miles to the very end of U.S. Route 6. With its narrow streets, Provincetown is incredibly crowded – "like Bombay" one friend described it. I suggest day-trippers come into town from the north, off U.S. 6 onto Conwell Road and park at the Monument. The only free parking I have seen in the town is at the various hotels and inns, which is only for their tenants. Provincetown is quite compact: only three miles from end to end, and an easy walk.

Cape traffic in the summer is quite brutal with long delays and jams. Ignore the "Cape Cod Tunnel" stickers you see on cars. The tunnel does not exist; it is merely wishful thinking and a local joke.

Cape Air flies out of Logan Airport, Boston, to Provincetown, Hyannis, Nantucket, Martha's Vineyard, and Providence, R.I.

In summer, the Bay State Cruise Company at Commonwealth Pier, South Boston, has a daily boat to P-Town. Boston Harbor Cruises has a fast ferry, three boats per day and 90 minutes from Boston to Provincetown, from mid-May to mid-October. They are based at Long Wharf in downtown Boston. The Capt. John Boats are at



the Town Pier in Plymouth and have a daily boat in summer to P-Town. These boats are quite small and reservations are strongly advised.

There is also the Cape Cod Railroad, but this only goes as far as Hyannis. Mostly freight, it does have dinner and excursion trains in the summer and fall. There is also the Bay Colony Line which goes along Buzzards Bay down the west edge of Cape Cod to Falmouth. It is famous for its weekly "Trash Train," carrying refuse off the Cape.

There are a number of bus lines that service the Cape, particularly the blue and silver Plymouth & Brockton buses which run to Provincetown. "The Breeze" is the Cape Cod Transit bus, but it is a shuttle. The one at Provincetown runs the full length of the town and as far as campgrounds in neighboring Truro. "P-Town" also has sightseeing trolley buses looping around the town.

What to Do

I can't think of any other place that offers so much. Sightseeing and shopping tops the list. There are museums galore and art galleries and restaurants for every taste. Most unusual is the Marine Specialties shop, which seems to have just about everything imaginable. Most of the tourist attractions are on the aptly named Commercial Street, a one-way running along the harbor's edge. The "townies" live more inland with their stores and businesses along or just off the two-way Bradford Street.

For kids of all ages, there is the fascinating Whydah Pirate Museum on MacMillan Wharf (named for Donald B. MacMillan, the famous Arctic explorer), with relics from a real pirate ship wrecked a few miles down the coast in 1717. The ship is named for the world's largest slave port, Whydah, Dahomey (now Ouidah, Benin, which is a museum itself). Indeed, the ship was a slaver when captured by the pirates. The museum concentrates on the personal effects and lifestyle of the pirates.

What else? Fishing from shore or on a charter boat, harbor cruises, whale watches, taxi rides through the sand dunes, surfing, bicycling, hiking, swimming, kite flying, and more. Nearby are the Province Lands of the Cape Cod National Seashore with its nature walks.

Radio Connections

Cape Cod is well known as the site of Marconi's famous radio station "CC" of 1903. A centennial celebration is planned for the summer of 2003.

Provincetown's only radio station is WOMR, "Outermost Radio," on 92.1, which went on the air in the summer of 1982. Just this past summer, it celebrated its 20th birthday with a rebroadcast of its very first program. WOMR is in an old Victorian house at the corner of Center and Bradford Streets.

Starting out at 1,000 watts, it was recently increased to 6,000 watts. Its transmitter antenna is on the town's largest water standpipe atop a high sand hill called Mount Gilboa. It is a community station catering to all the groups in town, and its $260,000 annual operating budget is funded by the local businesses and various private donors. Each summer, WOMR hosts a Music, Food, and Wine Festival at the Cape Cod Melody Tent in Hyannis as a successful fundraiser. All but three of its personnel are volunteers. As for music - "We play anything," executive director Bob Speay told me.

A few years ago, WOMR started broadcasting the New York Metropolitan Opera, surprising everyone at the station when it became its most popular program. The late Ernie Cooper hosted a program of marching band music, his own collection, over WOMR. It is said to have been the only such program ever aired anywhere. Seay told me that at present, Cooper's collection is stored in a barn but there are no future plans for it. Cooper was most famous for his MW DXing.

I told Seay that I could easily pick up WOMR at my house 34 miles across the Bay, but many mornings it has to fight the New Hampshire relay of the hard rock Boston station WFNX for the frequency. Seay said that it is planned to move WOMR down to Orleans where its signal would cover the more populous mid-Cape area. But anyone can tune in to WOMR over the internet at **http://www.womr.org**.

As for DXing, it is amazing! Cape Cod sticks far out into the North Atlantic and signals from overseas – LW and MW stations – are often received loud and clear even by more modest receivers. The low powered SW stations from Africa and the Middle East boom in, whereas just a few miles inland, these signals quickly fade away to nothing.

Where to start with scanners? The frequency list I include (see following page) is just the basics, there is so much to hear. I tried to create a list that is helpful to beginners as well as being useful to the more experienced. With the ocean on three sides, the marine band is often far more active than public service frequencies. Visitors should load the full marine band into their scanners and, with the nearby airport, the full air band as well.

The Massachusetts State Police now uses an 800 MHz trunked system. It appears that 853.8370 is their general statewide frequency and 856.2525 is for operations on Cape Cod.

Provincetown is only one of the many places from which I have enjoyed DXing. Do a little research on your own and you should find the same excitement at your favorite vacation spot.

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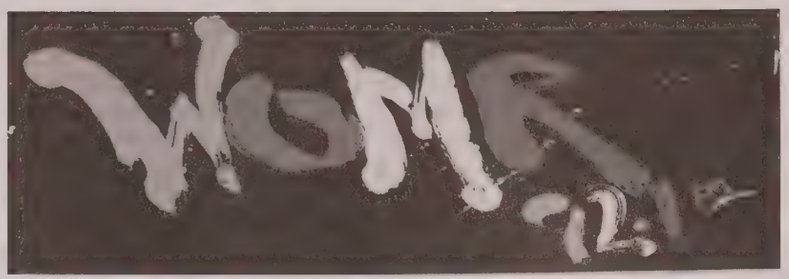

WOMR 92.1 fm
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Provincetown Pilgrimage

Frequencies kHz
389 - PVC, Provincetown (NDB)
1610 - Provincetown TIS

Frequencies MHz
33.460 - Provincetown Fire Dept.
33.680 - Cape Cod area fireground
33.700 - Cape Cod Fire net
42.440 - State Police, statewide
42.500 - State Police, Cape Cod
47.140 - State Highway, Cape Cod
47.740 - townsT water depts.

92.10 - WOMR-FM, Provincetown

118.200 - Approach/departure, Cape Cod
122.800 - Provincetown Airport
123.050 - copter to copter
123.450 - plane to plane
123.470 - plane to plane
125.400 - Coast Guard copters
129.250 - Cape Air (Boston to Cape, Islands, and Providence)
129.400 - air - ground
131.800 - plane to plane
132.900 - planes over Cape Cod

146.730 - Ham repeater
147.045 - Ham repeater
147.180 - Ham emergency
147.255 - Ham repeater
147.330 - Ham repeater

151.145 - State Fire
151.205 - State Fire
151.310 - State fire towers
151.865 - Dune Tours
153.350 - WATB-FM (media-Yarmouth)
154.280 - Mass. fire intercity
154.515 - Dune Tours
154.570 - Pilgrim Monument

155.055 - Harbor masters
155.565 - Cape Cod Police net
155.700 - Provincetown Police
156.180 - Provincetown Highway Dept.
156.350 - Dolphin Whale Watch
156.420 - yacht clubs + marinas
156.475 - yacht clubs + marinas
156.650 - Cape Cod Canal transit
156.950 - Bay State Cruise Line
157.025 - Capt. John Boats
157.075 - Coast Guard ops
157.100 - Coast Guard broadcasts:
1005, 2205 UTC Cape Cod Bay
1035, 2235 UTC Mass. Bay
158.835 - Cape Cod Marine Patrol
158.970 - Mass. police intercity

160.305 - Bay Colony Railroad
160.725 - Cape Cod Railroad
162.475 - NOAA Weather, Boston, KHB-35
162.550 - NOAA Weather, Cape Cod, KEC-73
163.4125 - Army Engineers, Cape Cod Canal ops
164.225 - Coast Guard SAR, secondary
164.550 - Coast.Guard SAR, primary
171.725 - Cape Cod National Seashore
173.325 - Cape Cod Standard Times (media)

453.575 - Cape Cod Transit
461.200 - Cape Cod Ambulance
463.025 - C-Med. Cape Cod
463.100 - C-Med, Cape Cod
463.150 - C-Med, Cape Cod
463.175 - C-Med, Cape Cod
464.100 - Fire Notification Service
464.150 - Cape Cod Hospital

853.8370 - State Police, statewide
856.2525 - State Police, Cape Cod
866.0125 - National Police call
866.3125 - State Fire relay, statewide
866.8375 - State Fire relay, statewide
868.9375 - State Police relay, statewide
868.9500 - State Police relay, statewide

Other

kHz
194 - TUK, Nantucket - voice weather
279 - CQX, Chatham airport
382 - LQ, Lyndy - voice weather

680 - WRKO, Boston - Talk
850 - WEEI, Boston - Sports
1030 - WBZ, Boston - News, talk
1170 - WUMB, Orleans - U. Mass
1240 - WBUR, W. Yarmouth - NPR
1390 - WPLM, Plymouth - EZL music
1510 - WWZN, Boston - Sports

MHz
89.7 - WGBH, Boston - NPR
94.9 - WATB. Yarmouth - relays WATD
95.9 - WATD, Marshfield - Pop
99.1 - WPLM, Plymouth - EZL music
99.9 - WQRC, Barnstable - EZL music
102.3 - WCDJ, Truro - Variety
104.1 - WBCN, Boston - Talk, rock music
107.9 - WFCC, Chatham - Classical music

33.660 - Truro Fire
37.180 - Truro Highway
155.200 - Truro Police

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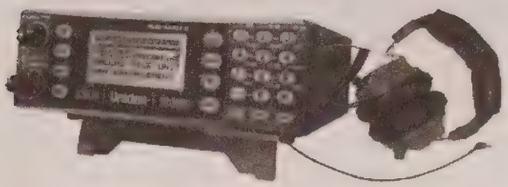

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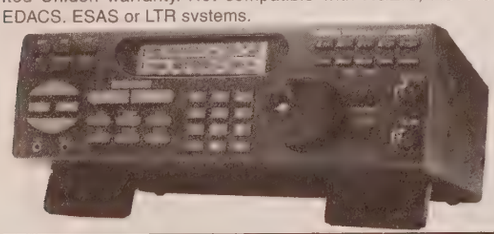

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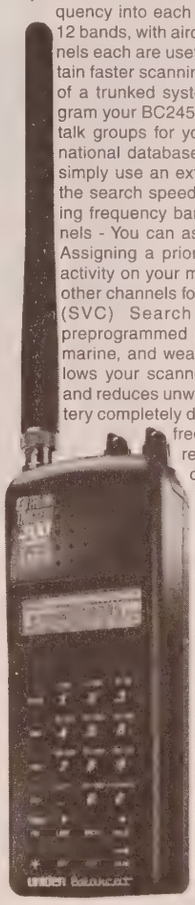

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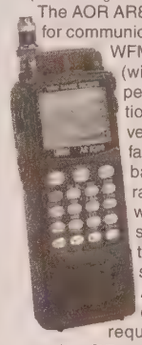

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They Put the SAM in Uncle Sam

By Ron Peron

We're all familiar with the sight of Air Force 1 as it carries America's most visible VIP (Very Important Person) on his trips across the country and around the world. But there's a fleet of lesser-known aircraft, whose mission is to carry our government's VIPs on official trips and visits. US military VIP flights are known as Special Air Missions, or SAM flights. The primary unit providing governmental VIP flight support is the USAF's 89th Airlift Wing at Andrews AFB Maryland.

Background

On July 12, 1991, the 89th MAW merged with the 1776th Air Base Wing to become the 89th Airlift Wing (ALW). The airlift wing is an Air Mobility Command (AMC) asset directly assigned to 21st Air Force, headquartered at McGuire AFB, N.J. Units assigned to the 89th ALW, based at Andrews AFB, Md, include: the Presidential Airlift Group (PAG), the 1st Helicopter Squadron, the 1st Airlift Squadron, and the 99th Airlift Squadron.

The Presidential Flight

Also known as the Presidential Airlift Squadron (PAS), the Presidential long-range air transport fleet consists of two specially configured Boeing 747-200Bs – tail numbers 28000 and 29000 – with the Air Force designation VC-25A. When the President is aboard either aircraft, or any other Air Force aircraft, the radio call sign is "Air Force One."

The principal differences between the VC-25A and the standard Boeing 747, other than the number of passengers carried, are: the electronic and communications equipment aboard Air Force One, its interior configuration and furnishings, self-contained baggage loader, front and aft air-stairs, and the capability for in-flight refueling.

Accommodations for the President include an executive suite consisting of a stateroom (with dressing room, lavatory and shower) and the president's office. A conference/dining room is also available for the president, his family and staff. Other separate accommodations are provided for guests, senior staff, Secret Service and security personnel, and the news media. Two galleys provide up to 100 meals at one sitting. Six passenger lavatories – including handicap facilities – are provided as well as a rest area and mini-galley for the aircrew. The VC-25A also has a compartment outfitted with medical equipment and supplies for minor medical emergencies.

These aircraft are flown by the presidential aircrew, maintained by the Presidential Maintenance Branch, and are assigned to Air Mobility Command's 89th Airlift Wing.

VC-25A # 82-8000 is the primary Presidential aircraft. When the President is not on board it uses the callsign Venus 01. The back-up aircraft is VC-25 # 92-9000 and uses the callsign Venus 02. Whenever the President flies, especially on cross-country or international flights, both aircraft will be used. One of them will be using callsign Air Force 1 and the other serves in a back-up role using the appropriate SAM callsign. On some US trips, once the primary aircraft is airborne and the crew is satisfied with its performance, they will radio back to SAM Command that the back-up aircraft is released and it will return to Andrews. Also, on some short US trips (New York, Boston, etc) the President will occasionally use one of the older VC-9's in the 89th's inventory. However, this aircraft will use the Air Force 1 callsign.

In addition to the VC-25s, other aircraft (C-141s or C-5s) will also be used in support roles transporting advance Secret Service and White House Communications Agency teams, their equipment and vehicles. There have been some reports that Reach aircraft using "T" suffix to their number, i.e. Reach 498T, are supporting Presidential visits.

On international flights the ABNCP E-4s are also deployed to support the National Command structure. These E-4Bs carry the numbers:

73-1676
73-1677
74-0787
75-0125

They have been known to fly the occasional SAM mission as SAM 676/677/787/125.

1st Helicopter Squadron

The 1st Helicopter Squadron (UH-1s/ callsign Mussel) does not provide Presidential airlift support. Their mission is to provide local airlift for the Executive Department, high-ranking dignitaries and distinguished visitors. Their mission is also to be prepared to evacuate key military personnel from the Pentagon in the event of a nuclear attack. This mission was confirmed on September 11th after the terrorist attack on the Pentagon. Shortly after the attack, several Mussel helicopters were noted flying into the Pentagon area and then departing – probably extricating military VIPs to safe havens.

The 1st Helicopter Squadron is also tasked with search and rescue and emergency medical evacuation. I have heard them conducting practice search and rescue drills, one of which involved a hostage rescue scenario.

1st and 99th Airlift Squadrons

In addition to the Presidential Flight, there are two other VIP transport units based at Andrews AFB subordinate to the 89th ALW; the 1st Airlift Squadron and the 99th Airlift Squadron. According to their Web site, the mission of these Airlift Squadrons is to "Maintain a team of dedicated professionals to provide unsurpassed DV (distinguished visitor) airlift."

The squadron operates specially configured C-9, C-20, C-32 and C-37 aircraft on Special Air Missions (SAM) directed by HQ USAF supporting the Vice President, and other US and foreign senior diplomats. Selectively manned aircrews are responsible for the detailed planning and execution of sensitive missions of national and international consequence. The crew establishes direct coordination with numerous agencies to include Headquarters United States Air Force, embassies, and congressional offices.

Crews conduct these global missions isolated from normal supply and command and control structures. The aircrews accomplish Special Air Missions (SAM) into unfamiliar airfields, in all weather conditions, with 99.5% reliability, often while the world is literally watching. The crews obtain diplomatic clearances and coordinate all enroute support requirements essential to mission accomplishment.

In the past, typical missions have included supporting Congressional delegations sent to monitor election results in Haiti; shuttle diplomacy missions in the Middle East and the Balkans; missions flown in support of the 50th Anniversary of the United Nations; and the V-E and V-J Day celebrations. The 99th Airlift Squadron routinely conducts First Lady and Air Force Two missions and provides aircrew members to augment Air Force One missions. The 99th Airlift Squadron has a proud tradition of accident-free transportation, first class passenger service, and unsurpassed reliability.

Today the 1st and 99th Airlift Squadrons continue to provide VIP transportation and is in the process of modernizing its fleet of aircraft. As far as I've been able to learn, the following aircraft are in their inventory:

SAM/ AIRCRAFT #	AIRCRAFT TYPE	NON-SAM CALLSIGN
90-0300	C-20	VENUS 30 (99th AS)
92-0375	C-20	POSS VENUS 35 (99th AS)
73-1681	VC-9	VENUS 81 (99th AS)
73-1682	VC-9	VENUS 82 (99th AS)
73-1683	VC-9	VENUS 83 (99th AS)
85-0050	C-20	VENUS 50 (99th AS)
86-0201	C-20	VENUS 21 (99th AS)
86-0202	C-20	EXECUTIVE 1 FOXTROT- VENUS 22 (99th AS)
86-0203	C-20	VENUS 23 (99th AS)
86-0204	C-20	VENUS 24 (99th AS)
86-0206	C-20	EXECUTIVE 1 FOXTROT-VENUS 26 (99th AS)
86-0403	C-20	VENUS 43 (99th AS)
98-0001	C-32A	VENUS 91 (1st AS)
98-0002	C-32A	VENUS 92 (1st AS)
99-0003	C-32A	VENUS 93 (1st AS)
99-0004	C-32A	VENUS 94 (1st AS)
97-0400	C-37A	VENUS 40 (99th AS)
97-0401	C-37A	VENUS 41 (99th AS)
99-0402	C-37A	VENUS 42 (99th AS)
99-0404	C-37A	VENUS 44 (99th AS)

The C-20B/E are Gulfstream III aircraft, the C-20H is a Gulfstream IV, and the C-37A is a Gulfstream V aircraft.

SAM aircraft use the Venus callsign when they are not carrying VIPs. Thus, listeners in areas other than Washington DC will probably not hear this particular callsign. There are exceptions – when SAM aircraft are being ferried to/ from aircraft factories for upgrades or modifications. Occasionally an aircraft will fly from Andrews to a particular location as Venus, pick up a VIP and return as SAM ###.

The Executive 1 Foxtrot callsign is used by any aircraft carrying a member of the First Family. Currently this usually means that First Lady Laura Bush or their daughters are on board. Lately aircraft # 60202 & 60206 appear to draw that duty. In addition, at least one of the C-20s is designated as the " alert bird" on any given day. I assume this means that they are on call should a First Family member have to make an unscheduled trip out of Andrews. The C-20 on alert duty will fly local training flights in the Washington area maintaining contact with SAM Command Post should they be required to return to Andrews.

Technical Data

Here are some of the callsigns and frequencies that I've logged associated with VIP transport activity.

Callsigns

Air Force 1	President On Board
Air Force 2	Vice-President On Board
Executive 1 Foxtrot	First Family Member On Board
SAM	99th AS-Special Air Mission
Venus	99th AS-SAM without VIP Aboard
Mussel	1st Helicopter Squadron
SAM Command	89th ALW Command Post
Nighthawk	HMX-1 Executive Transport Aircraft

When using the Venus callsign they usually use Venus + two digits from their tail numbers; i.e. Venus 81 is C-9 #31681; Venus 24 is C-20 #60204. There is an exception; Venus 01 is Air Force 1 (28000) without the President on board and Venus 02 is 29000 (AF1 backup aircraft).

Both 28000 & 29000 have been noted periodically practicing ILS (instrument landing system) approaches at both Baltimore-Washington International and Dover AFB, which are probably alternate airfields for these aircraft should conditions require them to divert.

All the SAM/VENUS aircraft also have HF and secure communications capabilities. The SAM and Venus aircraft tend to use the published ATC VHF frequencies, except when talking with the SAM CP.

Frequencies

118.400	Andrews Tower
118.950	Washington Departure
119.300	Andrews Approach
119.850	Washington Approach
120.750	Washington Area Helo Unicom
122.850	Andrews Dispatch
124.200	Washington Approach
125.650	Washington Departure
136.725 (AM)	SAM/Venus Interplane
141.550 (AM)	SAM Command Post
141.700 (AM)	1st Helo Sqdn
142.750 (AM)	Venus Control
251.900	1st Helo Sqdn Search & Rescue Freq
292.200	1st Helo Sdqn Ops
372.200	Andrews Dispatch
378.100	SAM Command Post

[Editor's note: More frequencies for Andrews Air Force Base and the surrounding area can be found in the Grove *Monitoring the Military* on CD and also at:
http://www.monitoringtimes.com/html/mt_frequency_exchange.html]

NAMIBIA - Land of Diverse Beauty

By Colin Miller

From vast expanses of desert, moving sand dunes and the spectacular Fish River Canyon, to savanna, woodlands and forests – the southern Africa country of Namibia is a land of contrasts. It gets its name from the world's oldest desert, the Namib, located along the Atlantic coast.

About the Country

Namibia has an area of 318,000 square miles, or about the size of Texas and New York combined. This ranks it as the 31st largest country in the world. It is bounded by Angola on the north, Botswana on the east and South Africa to the south. The border also just touches those of Zambia and Zimbabwe at the eastern end of the Caprivi Strip, a narrow finger of land stretching east along the frontier with Angola.

The population is more than 1.8 million. The inhabitants include a small number of Bushmen, as well as members of the Herero, Ovambo, Tswana, Kavango, Damara, Nama and other groups. It also includes some Whites of German, English and Afrikaans descent. Only about a third of Namibia's population lives in urban areas.

In the late 15th century the Portuguese navigators Diogo Cão and Bartholomew Diaz explored the coast. The country became a German colony in the late 19th century. In World War I, South Africa, fighting on the side of the Allies, took the country and administered it until independence. In 1966, the UN General Assembly declared that South Africa's mandate was terminated; however, South Africa disregarded this resolution. Two years later, the UN adopted the country name Namibia, although South West Africa was still officially in use. From 1968 the South West African People's Organization, SWAPO, was involved in a violent and bitter struggle against the South African army and the South West Africa Territorial Force, SWATF, for control of the country. Independence was finally achieved on March 21, 1990.

The capital is Windhoek, a small city of about 200,000 inhabitants, which has a German influence in some of its architecture. In fact many tourists see it as a most un-African city. It is cosmopolitan with excellent hotels, restaurants and shops, and is situated in a hilly region at almost the exact center of the country. The population is increasing due to a lack of employment in the rural areas. Other towns include Tsumeb, Keetmanshoop and Lüderitz. The major port of Walvis Bay formerly belonged to South Africa as part of the Cape Province, but this was relinquished in 1994 and it is now Namibia's only deepwater port. English, German and Afrikaans are the official languages, and of course those languages mentioned above are also spoken.

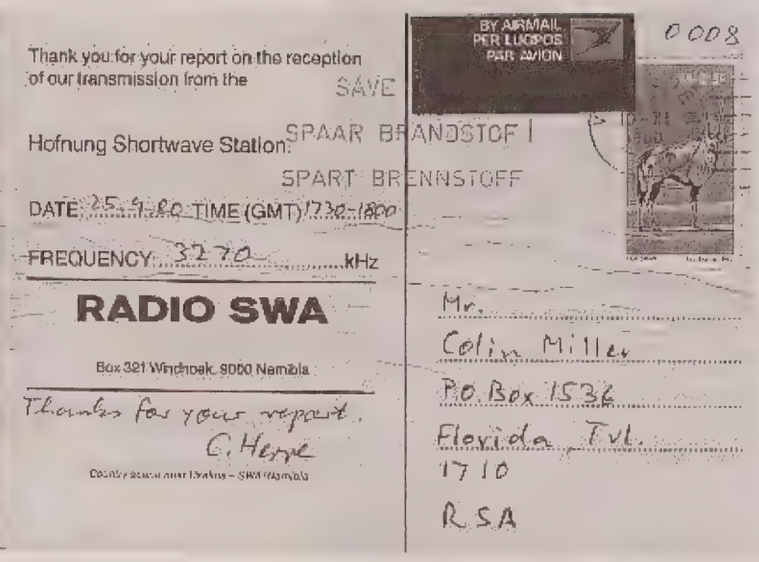
Namibia has great mineral wealth, especially alluvial diamonds near the mouth of the Orange River in the extreme southwest. The most important agricultural products are cattle and karakul sheep, the latter being raised for their valuable skins. The fishing industry plays a significant role in the economy; lobsters and anchovies, among other fish, are caught off the coast.

There is quite a lot to attract tourists to the country. The most famous game park is the Etosha National Park, which has a variety of wildlife. The Great Fish River Canyon is one of the most impressive sights in Namibia. For those who like to visit the desert, the sand dunes in Kolmanskop, a ghost town, have surrounded the buildings.

NBC, formerly Radio SWA, has issued some beautiful QSL cards over the years, which depict the "land of contrasts" through its various tourist attractions, flora and fauna.

Broadcasting Debut

Broadcasting came late to Namibia, although South Africa had already provided a shortwave service for many years. In South West Africa, as it was then, the South African Broadcasting



Corporation was responsible for the introduction of radio services on FM for the indigenous peoples, as was the case in South Africa. This commenced in November 1969 with the birth of Radio Ovambo, broadcasting in the Kwanyama and Ndonga languages, and also Radio Herero and Radio Damara Nama.

The introduction of Radio Kavango along the northeastern border with Angola followed in February 1976 in the Kwangan, Mbukushu and Jeiriku languages. However, the SABC relinquished control of these services in May 1979, when the South West African Broadcasting Corporation (SWABC) came into being by proclamation of the Administrator General. On Oct 10, 1980, the SWABC inaugurated two 100 kW shortwave transmitters at Hoffnung near Windhoek. This station relayed the English, Afrikaans and German services on the one transmitter, and the indigenous services on the other.

The other NBC

On March 1, 1990, the SWABC was renamed Namibian Broadcasting Corporation, which aims to provide information, education and entertainment to its listeners, without discrimination or bias. The NBC now operates radio services in several languages, with regional programming at various times. These are as follows:

- National Service 1 in English
- National Service 2 in Afrikaans
- National Service 3 in German
- Oshiwambo Service in Ovambo and Kwanyama for the north and northwest
- Otjiherero Service in Herero and Setswana for the east
- Damara/Nama Service in Damara and Nama for central Namibia
- Rukavango Service in Kwangali for the Caprivi Strip
- Radio Opuwo, which opened in 2000, and is a supporting unit to the regional station at Oshakati in the north

Most of these services originate from the studios on Cullinan Street in the northern industrial area of Windhoek. The NBC's radio service reaches about 97 percent of the country over a network of FM stations, as well as shortwave, broadcasting from regional centers at Katima Mulilo in Caprivi, Rundu in the Kavango region, and Oshakati in the Oshana region. In addition to the three regional centers, NBC has contribution centers at Otjiwarongo in central-northern Namibia and Keetmanshoop in southern Namibia.

News and educational programs form a large part of daily output, and there is also audience participation through call-in shows. In *Chat Show* and *Open Line*, listeners air their views and opinions about many issues, as long as these do not infringe on the rights and freedoms of other citizens. These talk shows also provide a channel of communication between the public and political decision-makers. Responses to listeners' questions about government policies are aired on the daily *Feedback* program. The NBC is striving to add more local content to its programs, but this is difficult to achieve due to financial constraints.

The Education Section was established in 1985, and provides formal and informal education programs covering all ages from pre-school to adult. Some programs are imported from other countries, but it has developed its own programs to meet the local curriculum.

The NBC has taken a step towards digital broadcasting. A computerized studio has been installed in Windhoek, and plans are to extend this to the entire network.

Following the liberalization of the airwaves through the Namibian Communication Commission Act, a number of independent stations have opened in recent years, broadcasting on FM. These include commercial, religious and community stations.

Namibia can usually be logged in North America on 3270 or 3290 kHz from fade-in around 0100 until sign off at 0715. These channels relay the National Service in German and Afrikaans, however. They are not always in parallel or heard at the same time. So it just amounts to a matter of luck. You might also try 7165 kHz between 0500 and 0630 in English.

The address for reception reports is NBC Short-wave Section, P.O. Box 321, Windhoek, Namibia. The station is a good verifier. Prior to independence, the cards had the name Radio SWA, and were modeled on those of Radio RSA in South Africa. The station has issued some beautiful QSL cards over the years, which depict the "land of contrasts" through its various tourist attractions, flora and fauna.

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Roberto Clemens Galletti Di Cadilhac

Neglected Radio Pioneer

By Michel Berlie-Sarrazin

This is not the first time that *Monitoring Times* has rescued a neglected radio genius from oblivion in order to pay tribute to him. If these persons are almost completely forgotten, it is not due to a lesser interest or quality of their work and discoveries, but only to the fact that fate allowed other figures to put them in the shade.

So I am happy to make my contribution to this approach and, if not to restore Mr. Galletti's rights, at least to participate in his rediscovery.

A Life Devoted to Radio

Born on 29 December 1879, in the town of San Vezano (Italy), near the Adriatic, of a French-Italian father and an English mother, Roberto Galletti was naturally trilingual. Very early in his life he expressed his interest in mathematics and physics, especially knowledge related to electricity. He studied to become an engineer and joined the Italian Engineers and Architects Society in 1908. When he married a Frenchwoman (widow of Count De Messimy) he moved to the town of Murs in France.

From 1906 to 1926, Galletti took out patents on radio-telecommunications electronic circuitry improvements, beginning in England, then in Italy, Belgium, France, Germany, Portugal, Russia, Spain, Switzerland, Canada and the US.

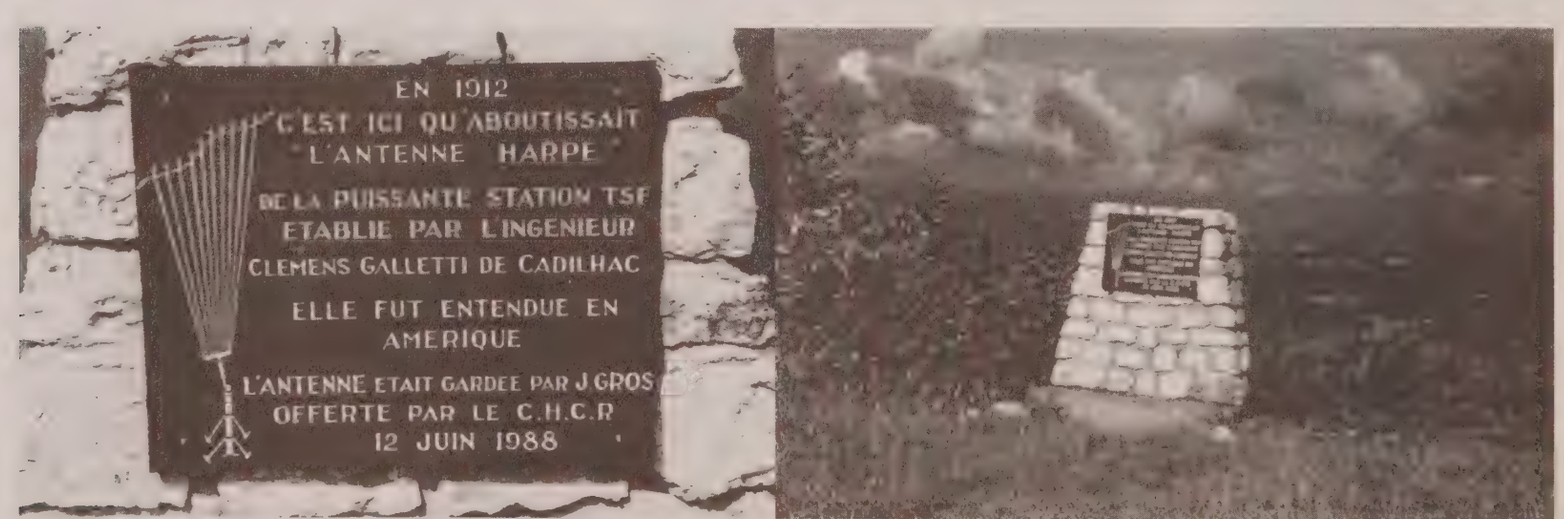
In 1908 he made contact with the Cilindroïd Company (London) with the aim of setting up wireless telegraphy communications between France and the East Coast of the US. The French government gave him temporary authorization to begin his experiments in France. First he made trial transmissions starting in 1909, between his first station located in the town of Villeurbanne (east of France) and other stations located in France or in Algeria.

Later, in 1912, the "Galletti Wireless Telegraph and telephone Company Ltd." was set up and he began to build one of the most powerful radio stations existing at that time. This station was located about one hundred kilometers southeast of the first one – near the Rhône river, close by the village of Leschaux in Savoie. During the winter of 1913, Galletti's radio-telegraphic emissions were picked up at the Goldschmitd Company's Tuckerton station in New Jersey with a good signal/noise ratio.

Transatlantic Radio Contacts Technology

The radio station in Leschaux was equipped with six 10-kilovolt generators fed by two special high tension cables. Resistors were in liquid form, and it used 800 capacitors. To minimize HF losses, all the wooden buildings rested on a layer of asphalt or porcelain insulators.

The oscillating system was a synthetic combination made from the Poulsen and Majorana low power sustained oscillations systems and the Marconi high power single electrical discharge (producing damped oscillations) system. It was a spark gap system (providing high-power sustained oscillations) and was driven by oil relay. The carrier was



The commemorative plaque located near the village of Saint Maurice de Therens, at the top of the cliff.

musical note modulated ~~or pure~~.

On the emitting side, high speed CW (50 signals per second) was used, thanks to automatic Baudot or Weatstone keying devices. The emitting radiated power was about 90 kilowatts (80 amps). The working wavelength was 7 kilometers (that is about 43 kHz) with a 10% to 15% possible drift.

On the receiving side, an Orcing relay was used to detect arriving electromagnetic waves and to extract the telegraphy from picked up signals, with an automatic recording on paper tape.

Undoubtedly, the most impressive part of this station lay in its antenna. It was in a harp or fan shape, with 10 wires, each being 950 meters long, and tightened between the foot and the top of a steep chalk cliff facing the West (a perfect location to communicate with the US). Wooden poles, evenly spaced 30 meters apart along the cliff crest and another (stayed) one at its foot, supported the entire aerials system. To improve the grounding, 10 strips of copper were buried in the soil which was good and marshy, thanks to the nearby Rhône river.

At the Tuckerton station, the receiving antenna was an umbrella type supported by an 800-ft central tower. The detecting device was a Goldschmitd wheel. The VLF signals from France were estimated to be at least three times the minimal level necessary for establishing an exploitable contact, night and day. By means of indirect calculations, we are able to estimate that the signal level was in the 60 x 10^{-9} Watts (0.06 micro-watt) range.

First World War Turmoil

Unfortunately, in August 1914 the First World War began. Mr. Galletti proposed to use his radio station to help the French Army Signals Corps to transmit radio-telegrams to the Russian Army (our Allies of those days against Germany). The Signal Corps was having difficulty carrying out this essential job from its own Eiffel Tower emitting station.

In spite of (or "because of," see further) his offer to contribute to the war effort, the station was confiscated suddenly and dismantled by the Navy Department's personnel in September of the same year. In 1920 (two years after the war ended) the equipment was officially restored, but, in fact, the seals were removed only in 1922. Then Mr. Galletti discovered that his station was in a very bad condition: parts were missing and electronic circuitry was damaged. Damages were so significant and the repair costs were considered so high that the hope of starting again was quickly abandoned.

A panoramic view of the telegraphy station buildings near the village of Leschaux.

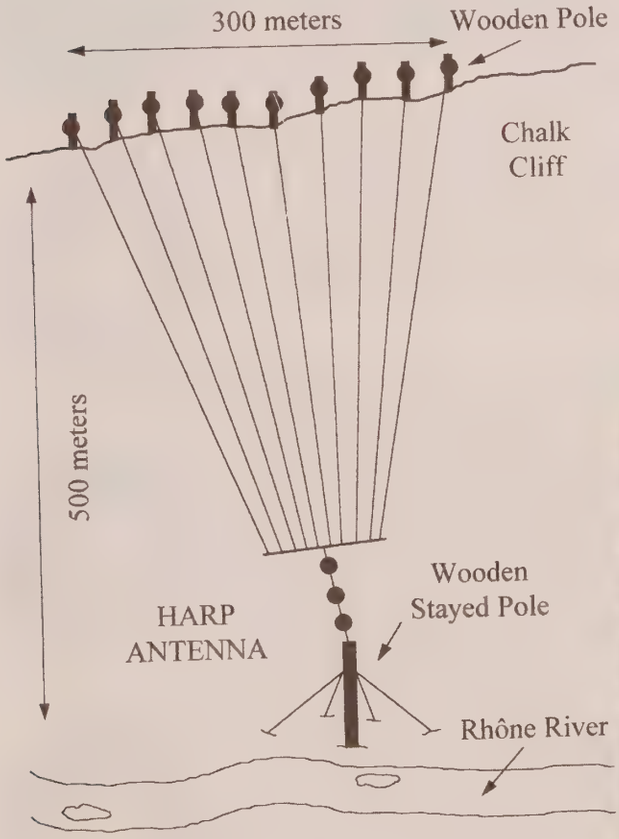
Cutthroat Competition

If we take in consideration the fact that the French Government had invested about 20,000 Francs and Mr. Galletti more than 600,000 Francs in this radio station, the financial loss was mainly his. But what is the explanation for this sad outcome? Many reasons can be put forward. Some of them were stated by Mr. Galletti himself, in both official and private writings.

First, it seems that French Army Signal Corps officers were embittered and jealous of the excellent results achieved by Mr. Galletti's radio station. They also seemed very anxious to promote the Eiffel Tower as the only radio station to be recognized.

The letter Mr. Galletti sent to the French War Department, in which he explained that to ensure reliable emissions to the Russian staff his radio station was more efficient than Army's, was probably the last straw. He supported this statement with the well-known fact that radio-telegrams aired from Eiffel Tower needed to be repeated up to fifteen or twenty times in order to be understood completely at the Russian receiving station. The truth of his argument made getting a closure decree against his station an even greater victory for his rivals, even though it was to the detriment of common patriotic and strategic interests.

To be fair, it must be emphasized that when first officer Captain Garnache of the Eiffel Tower Signal Corps was sent to Leschaux under orders of the Army Department to destroy the antenna network, he immediately noted the quality of this station which was of great interest to the French and Allied armed forces. In an attempt to extricate himself from this tricky situation, he made a smart move and simply postponed the hierarchy's directive. He drew up a re-



A sketch of the "harp" antenna.

A close-up of the telegraphy station in 1913, with buildings under construction.

port in which he gave his consent to Mr. Galletti to carry on the feasibility study for better transmissions aimed to Russia.

In addition, the regional prefect of Savoy and the regional general also resisted governmental pressures as long as possible, being aware of the vital importance of keeping Galletti's station operational. But all these courageous stands were only rearguard actions.

Actually, long before these events, dark clouds were already gathering on the horizon. From March 1918, heated exchanges on Mr. Galletti's station had taken place in the French Chamber of Deputies, with the Post and Telegraph Ministry, the Trade Secretary, the Budget Committee President, the Colonies Department, etc. in opposition to it.

Hidden behind arguments of national interest were the lobbying efforts of another famous telecommunications company. Mr. Marconi, acting through the French Radio Company, in conjunction with combined interests of Colonies and Army Departments, seems to have played no small part in these events. This hostility to Mr. Galletti probably had its source in the fact that Galletti's station had the ability to easily jam transmissions between two Marconi stations located in Canada (Glace Bay) and Ireland (Clifden) – further proof of Galletti's superior emission power.

Last Inventions

Although very distressed by this failure, for which he was not personally responsible, Galletti still pursued his research, this time in England.

In November 1926, the British Aeronautics Department allocated a hangar not far from London for his research. Early in 1927 he gave the British authorities a successful demonstration and met Mr. Ferranti. From 1928 to 1931 he worked with the Ferranti Company of Manchester on new, efficient radio-navigation systems for in-flight planes.

All the circuitry was enclosed in a box 3-feet long by 2 feet wide. The wavelength of the directional radio beam was about 12 meters; 120 miles away from the emitting radio station the beam was 4 miles wide. Long distance trials during flights above France and Spain proved the usefulness of this radio-navigation system.

In Memoriam

On 18 March 1932 he died at the age of 53 and was buried in the graveyard of Murs. A museum, erected in Saint Maurice de Rotherens (the small village located at the top of the cliff overhanging his station), is devoted to his memory.

Every other year on the second Sunday of June, a radio and ham festival takes place in this Saint Maurice de Rotherens village. In 2004, the next festival topic will deal with "Radio in the French Resistance during Second World War," and it's likely there will be a display of transceivers used by the Underground. These were quite often concealed in suitcases after being airdropped by American or English Allied Air Forces, and were easy to move as needed. If you are traveling in this region, the hamfest could make your visit to this historic radio site even more interesting.

The Galletti Museum in Saint Maurice de Rotherens.

How to Make a Communications Authentication Codes Table

By Ken Windyka (*ken.windyka@the-spa.com*)

Want to ensure your communications group on your FRS, MURS, or CB radio nets (or even on the land line telephone) are valid or authorized members of your group? Then construct a communications authentication code table as above and distribute to your members.

It's simple to use: The first communicator calling the second communicator uses the first letter in the left most column (underlined) combined with the letter in the top column (underlined).

The 2nd communicator authenticates by reading the letter in the row/column that intersects with the two. NOTE: Codes (intersections) are only used one time and the net control station should keep track of every code used to prevent reuse.

So, for example, communicator 1 states to communicator 2, "Authenticate BRAVO-GOLF" and communicator 2 states to communicator 1, "I authenticate WHISKEY." Simple to use but quite effective!

Table 1 COMMUNICATIONS AUTHENTICATION CODES

:	C	E	G	I
A	K	O	H	U
B	F	Q	W	B
C	M	F	T	S
D	Z	M	U	H
E	T	Z	G	W
F	J	D	K	O
G	Q	W	B	T
H	C	G	S	D
I	B	U	F	Z
J	N	C	M	Q
K	E	N	O	U
L	G	H	R	P
M	W	E	L	C
N	A	T	H	M

TABLE 2 PHONETIC ALPHABET:

A = Alpha	M = Mike
B = Bravo	N = November
C = Charlie	O = Oscar
D = Delta	P = Papa
E = Echo	Q = Quebec
F = Foxtrot	R = Romeo
G = Golf	S = Sierra
H = Hotel	T = Tango
I = India	U = Uniform
J = Juliet	W = Whiskey
K = Kilo	X = Xray
L = Lima	Y = Yankee
	Z = Zulu

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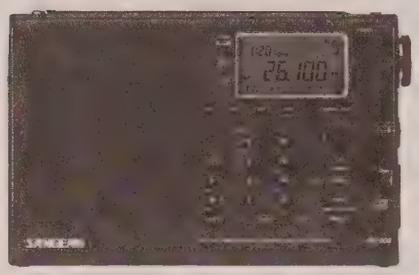

into

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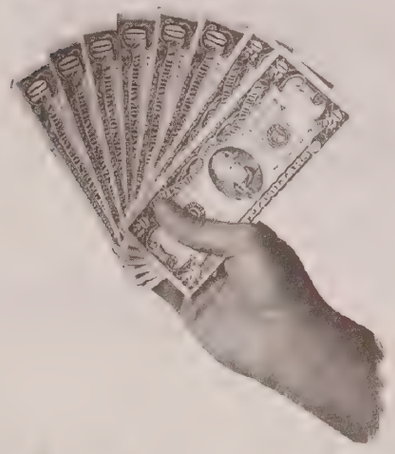

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Anthology

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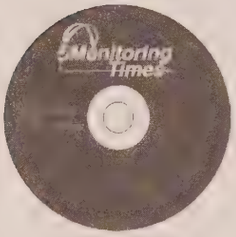

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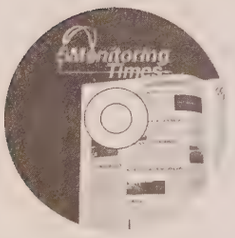

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Ken Reitz, KS4ZR
kenreitz@monitoringtimes.com

A Beginner's Look at Radio Modifications

Usually when we hear the words "radio modifications," we immediately think about ways people hack into their scanners to tune in the forbidden cell phone frequencies. There have indeed been volumes written on just that subject, but that's not what this month's *Beginner's Corner* is about.

There are many reasons to modify the radios you have in your listening post even if you exclude your scanning equipment. The biggest reason is to enhance receiver performance. Serious radio listeners are always seeking to push the envelope of their hobby. Another reason to modify is to correct manufacturing flaws or design defects. So competitive is the radio listening hobby today that some radios and hi-tech related products are rushed to the market place before all the bugs and glitches have been worked out. We've all bought gear which had some sort of problem right out of the box or developed a problem shortly after being used. If the product is under warranty the manufacturer will usually repair it for free (less shipping), but, if the problem developed out of warranty, consumers are faced with having to pay to get it right or trying to fix it themselves.

Another reason for modification is to change the design goal. For example, some ham related products are designed without much thought to performance on non-ham bands. While this isn't a warranty issue, the product is not performing as well as it might, and modifications could rectify that with little effect on the original design other than the improvement. However, some "design flaws" are actually protecting the performance of the radio for which it was intended and "correcting" the "flaw" may actually cause other performance problems.

Finally, changes in technology sometimes renders a product less useful if not obsolete. But, with a little ingenuity and modification the old technology can be adapted to work with the new. This has been the case with computers interfacing with old style radio gear. For example, modification can allow older 2 meter rigs, which might not be as useful, to work as dedicated packet transceivers.

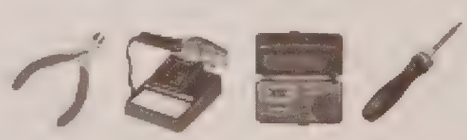
Of course, there are legal issues with modifying which have to be addressed. For instance, modifying scanners to receive blocked frequencies is illegal. Modifying ham gear to transmit on bands for which you are not licensed is also illegal. Modifying ham gear to operate on bands for which you are licensed, but in a way which creates unintended problems (such as making harmonic transmissions out of band or excessively wide transmissions within band) is also not allowed. As a ham you are allowed to modify or even build your own gear, but it's got to operate within the parameters laid down in the FCC rules pertaining to such operating. If you don't follow these rules you'll risk the wrath of the FCC.

❖ The Down Side to Mods

There are a couple of problems with radio modifications of which every reader should be aware. First, unauthorized mods on brand new gear will probably void the warranty. You'll be better off if you can get the mods done by a factory authorized technician. Second, any modification may actually result in unintended decline in performance or worse. Any time you start fiddling around with the delicate insides of some of our hi-tech radio gear, strange things can happen. Be careful.

Modifications published in books, magazines or found on the Internet may or may not actually work. Try to do as much research on the particular mod as you can before actually doing it or having it done to your own gear. The first thing you'll read or hear about modifications is that no one warrants the results of any modification. And no one will take the blame for anything you do even if it was suggested that it would work. You must accept the consequences of any modification you or anyone other than an authorized and warranted technician performs.

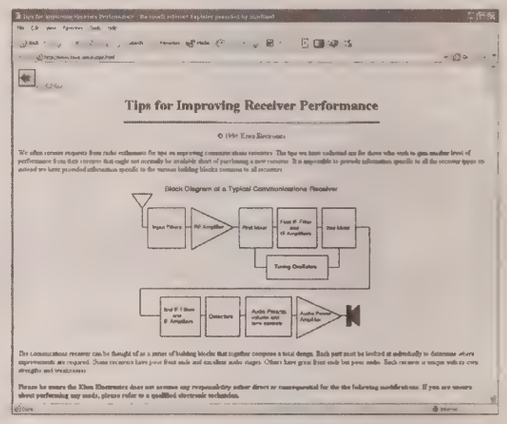
And, finally, consider this: It's possible that not only will the modification, once performed, not work but that corrective measures can't be taken to return the product to its original state. This can be a real mess. You have to figure out if you really want to take that kind of risk. You also must remember that even if the mods work it may not give you the same results as you would enjoy with a product actually designed to do what you're trying to get another radio to do through modification.



Get your information and gather up your tools. Time to make some modifications! (Courtesy Radio Shack)

❖ Get Yer Updated Info Here!

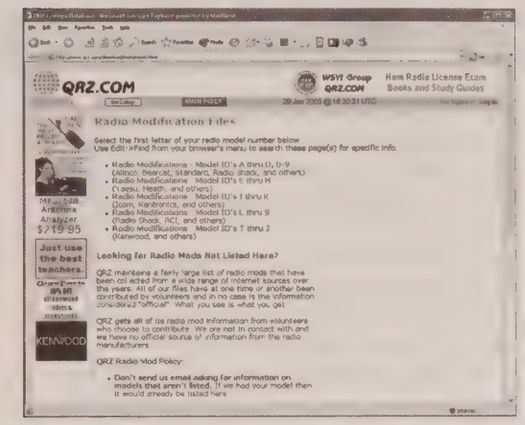
The best part about getting mod info on-line is that it's more likely to be up-to-date than that which is published in magazine or book form. This is critical, because there's so much potential for misinformation or outdated advice. The on-line sources will sometimes have a discussion about a particular mod and what experiences others have had doing the same thing. Look for the posting dates on each entry to see which is the latest info. There are quite a few sources for on-line information. Some of these sources are simply duplicating original sources, but in general, there's a wide range of modification information available.



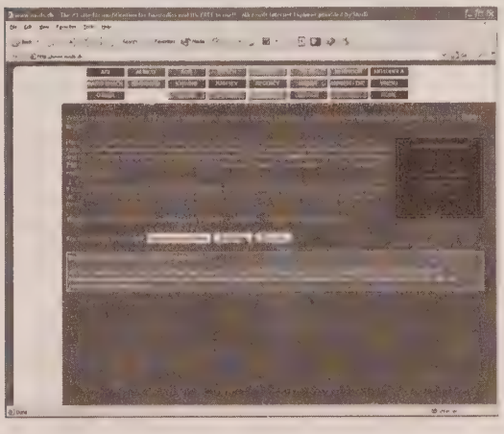
One of the best places for a beginner to start is the Kiwa Electronics web site (**http://www.kiwa.com/rxtips.html**) with its 16 page "Tips for Improving Receiver Performance." Print the article out to read later at your leisure. Beginning with a generic receiver block diagram, the piece follows the progress of a received signal through the antenna input, the input filters, the RF (radio frequency) amplifiers, the IF (intermediate frequency) filters, and to the AM detector. There's also a section on Audio Improvements and handling AC Line Induced Hum and Noise.

Kiwa specializes in making components to solve many of the performance problems of today's receivers and there's plenty of space given for them to hawk their wares. Still, the discussion is so well presented and the information so useful that most radio enthusiasts will learn something from the piece. There are many places along the way for beginners to get lost. Don't feel bad if a lot of it seems over your head. The discussion on improving receiver

audio and AC line induced hum and noise are of particular interest to beginners, because there are some fixes which don't require a degree of expertise and may be more easily accomplished.

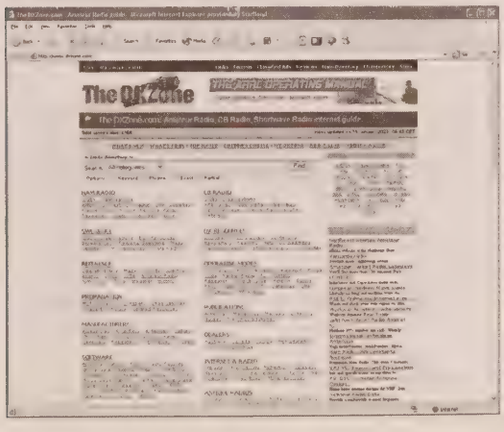


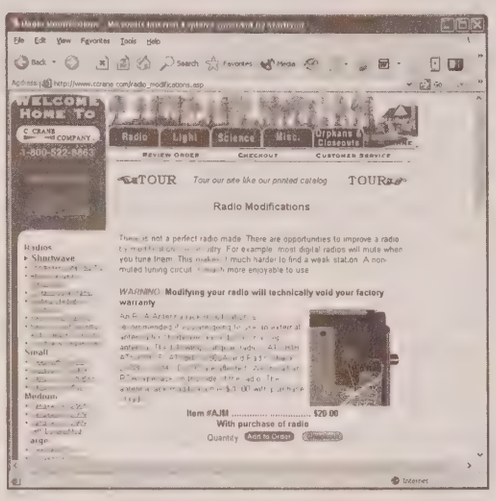
One of the more useful mod sites is on the popular QRZ.COM In their modification section (**http://www.qrz.com/download/main/mods.html**) you can choose from hundreds of mods for all the popular receivers and transceivers. Just click on the brand name and scroll down to the model in which you're interested. Clicking on the model brings up a list of all posted mods.



One of the most extensive and up-to-date sites is found on **http://www.mods.dk**. Another popular site is **http://www.radiomods.co.nz** which has extensive files on everything from mods to 10-codes. Of particular use are the mic diagrams which show the pin configuration of all the popular ham and CB transceiver microphones. I found this particularly useful when I had to repair a broken CB mic and when adapting a homebrew headset mic to a particular HT.

Next is The DX Zone (**http://www.dxzone.com**) which has many of the same links, files and articles. Hams who are ARRL members will appreciate the collection of various mods available on the League web site (**http://www.arrl.org**). While it's more specific to amateur radio applications there are, nonetheless, lists of modifications for various rigs which appeared in the magazine from 1953 to present. Go to the "members only" section and do an "article search" with the keywords: radio modifications. Others can get tons of additional information by doing a similar search on Google (**http://www.google.com**). Just page through the resulting search.





Some companies offer small modifications, such as turning off the mute on digitally tuned shortwave receivers or adding external antenna jacks. The C. Crane company does such mods on popular portables such as the Sangean 818, Radio Shack DX 390 and Grundig Satelit 700. These mods typically cost $20 with the purchase of a radio from them. For more information see **http://www.ccrane.com/radio_modifications.asp**.

When considering buying used shortwave or ham gear you may want to check on whether or not mods have been done to your "new" rig. If so, you may want to check those mods and see if they were done properly. You might be pleased with the results and it could end up being a bonus to your purchase. On the other hand, if they weren't done properly, you may want to give that rig a pass.

I found the various mods pages interesting reading and discovered a problem with one of my own radios of which I had not been aware. Perhaps you have a web site, book or other source with information on mods and you'd like to share them with the rest of us. If so, pass it along!

❖ Modification Procedures

The amount of technical expertise needed to actually perform modifications varies with the mod and the receiver. In general, modifications will require some experience with soldering and the ability to understand pictorial diagrams and follow instructions. Some modifications will be as simple as cutting a single piece of easily identified wire and taping the ends against shorting. Virtually all will require you to at least remove the outer cabinet. Some will ask you to dig a little deeper. Before you know it, you could have your $500 receiver in pieces, not sure of how to put it back together and with not quite enough screws to put it all right.

If you do plan to do your own mods, here are a couple of simple things to keep in mind: Always make sure the unit is unplugged from any antenna and any power source. Take the unit apart on a big clean surface on which you can leave it for days or weeks undisturbed. (It could come to that!) Lay down a sheet or other cloth to stop screws and other tiny parts from scooting across the surface and winding up on the floor. Have a bright light overhead. Use a large lighted magnifying glass on a stand. I found one of those cheap $30 magnifying lights with a clamp (available at most hardware stores) to be very useful. Use a proper wattage soldering iron and heavy duty stand. Use a solder with the highest content of silver you can find (2-4 percent).

There's always a certain amount of fear and trepidation the first time you do a modification on a receiver/transceiver. But, once you gain a little confidence from success, you'll feel better about tackling bigger and more interesting tasks. Start out with a radio you don't mind risking and have at it! Once down this road you'll want to keep your eyes open for other mods and interesting projects.

One place to look is the back issues of *MT*. I've been collecting various tidbits from other columns for eventual use for years. If you're new to *MT* you may want to consider the annual *MT Anthology* which is a complete year's worth of issues of this magazine on a convenient CD ROM. The last four years are currently available.

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Ask Bob

Bob Grove, W8JHD
bobgrove@monitoringtimes.com

❖ More On TV Channel Allocations

In our January column, a Philadelphia reader questioned why adjacent TV channels 6 and 7 were not assigned in his area, and wondered if there was a general FCC policy to avoid adjacent-channel licensing in the same city.

MT reader Joseph Martin did some additional digging to disprove the speculation. He discovered that in Miami, WTVJ (ch.6) and WSVN (ch.7); in Denver, KRMA-TV (ch.6) KMGH (ch.7); and in Omaha, WOWT (ch.6) and KETV (ch.7) have been on for decades.

So why aren't channels 6 and 7 both operational in Philadelphia? Joseph tells us, ..."there are existing stations on channel 7 in New York (WABC-TV) and Washington DC (WJLA). Both of these stations are located way too close to Philadelphia to allow a full power channel 7 station to operate there according to the minimum spacing dictated by the FCC for stations operating on the same channel."

Thanks, Joseph.

Q. *Why can't I hear my own 900 MHz cordless telephone on a scanner with the appropriate frequency range? (Larry Young, Ventura, CA)*

A. Chances are that your phone is spread spectrum, a digitally-controlled system that spreads your speech over a very wide bandwidth that is unintelligible to scanners. Take a look at the description on the box or in the manual, and it should tell you whether it's analog or digital. If it's digital or spread spectrum, that's your answer.

Q. *With last summer's concern over the West Nile fever, can the beat of a mosquito's wings be detected by radio? (Donald Michael Choleva, Euclid, OH)*

A. Not unless the 1000 Hz acoustic wave causes an electrical effect (none has been noted) and, if it did, you would need a receiver tunable as low as 1 kHz.

Q. *My antique radio has a speaker with a coil instead of a magnet which, I'm told, acts as a choke in the power supply. The coil is open and I've heard that there are ways of using a resistor and/or a capacitor in place of the coil. Can I? (Othello, email)*

A. If the field coil on the dynamic speaker is open, in most cases you can substitute the 120-volt AC primary of a general-purpose power transformer. Ideally, you really should replace it with a filter choke with approximately 2-8 henries inductance; that way the original filter capacitors, assuming they're still good, will be adequate filtering without additional filter capacitors being necessary.

If that isn't possible, you can also use a high-wattage (20 watts or so), wirewound resistor (100-200 ohms) as a substitute along with additional filter capacitors in parallel with the original filter capacitor(s) on the circuit side (not rectifier side) of the resistor to keep down the AC ripple and its resultant hum. The reason for the choke or resistor, rather than simply using a humongous filter capacitor to remove the hum, is to avoid damage to the circuit components from the inrush current when the power supply is turned on.

But you still have one big problem: The speaker used that field coil as its magnet so, without it, the speaker won't work; you need to replace the speaker as well with one of the correct size and close voice-coil impedance (4-16 ohms or so should work fine). Even better, try to find an old electrodynamic speaker with a field coil!

Q. *I just purchased the Grove OMNI II rooftop scanner antenna with 50 feet of coax. I have it resting against the wall of my room, coax connected, and its reception is much poorer than a hand-held with its rubber duckie, or another scanner with a plug-in antenna. What could be the problem? (Tim M., email)*

A. The OMNI II is an excellent antenna, substantially superior to rubber duckies and screw-in scanner antennas, so the fact that you are getting poorer reception than those comparative antennas shows that something is definitely wrong. Let's consider the possibilities:

(1) The antenna may be up against wiring, plumbing, a filing cabinet, heating/ air conditioning duct, or metalized Mylar insulation which shields your reception. Move it to a temporary elevated outdoor position to see if the reception substantially improves.

(2) The little balun transformer that came with the Omni could be defective; this rarely happens, but it does. Do you have a similar TV balun you can substitute to try?

(3) There may be something wrong with the coax or connector assembly. Inspect the F connector on the coax to be sure the center wire is not bent off-center, and that it's long enough to be about flush with the edge of the connector so that it's making contact with the adaptor.
If that all looks fine, get an ohmmeter and test the feed line with any adaptor(s) attached: With one meter prod on the shell and the other on the center pin, and no transformer attached to the other end of the cable, there should be no deflection on the meter. Next, short out the far end with a wire or other metallic object, and the meter should swing full scale.

(4) Be sure that your scanner does not have the attenuator switched on. Check also the center hole in the antenna connector; if the hole looks a little too large, it's possible that the little center prongs may need to be moved slightly closer by pressing a straight pin aside the outside edge of each one.

(5) The scanner itself could be defective; try plugging one of those rubber duckies into it to see if that improves reception. If it does, that leaves only the possibilities outlined above.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.) The current Ask Bob is now online at our website: http://www.monitoringtimes.com

Bright Ideas

Gary Webbenhurst
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garywebbenhurst@monitoringtimes.com

20 Attention shortwave listeners. The 16th annual SWL Fest is set for March 7-8th at the Kulpsville, PA Holiday Inn. This event is sponsored by NASWA. Contact them at **http://www.swlfest.com**. (Scanner buffs are welcome, too.) Register by March 2nd, and pay just $43 for full registration. Meals, and lodging are extra, of course. Sounds like a lot of fun, plus new friendships, and valuable information. Wish I could be there.

21 Do you live in the Pacific Northwest? The 5th annual Radio Communications Academy is slated for March 22-23rd. It will be at the Shoreline Conference Center, just north of Seattle. This intensive series of seminars and presentations is open to anyone who is active in disaster or emergency services, and who uses radio communications skills. Meet the movers and shakers of the first responder community, and see their communications vehicles. Lots of handouts, even prizes! You can register on line at **http://www.CommAcademy.org**. See you there! Just look for the AB7NI on my hat.

22 Live elsewhere, but wish to improve your radio communications skills? There are other academies springing up around the country. I know that northern California hosts one. Search the internet, or check with your local ham ARES/RACES officials, or your county emergency management office. Another noteworthy alternative open to anyone: sign up for the ARRL sponsored Emergency Communications internet class series for levels I, II, and III. Try **http://www.arrl.org**.

23 When planning your spring travel calendar, don't forget the Dayton Hamvention May 16-18. If you live in Ohio, or a nearby state, this is must do for hams, and non-hams alike.

24 The folks at the Public Broadcasting System (PBS) have a wonderful program on the history of broadcast radio in the US. If you missed it on your local PBS station, you can order a VHS tape, or DVD copy, from 1-800-PLAYPBS. Cost is $19.95 plus S&H. Well worth it.

25 A ham buddy of mine brought over his new Yaesu VX-1R for a modification he wanted me to perform. (If you are not a skilled electronics technician, don't even think about doing this yourself!) I cracked it open, and was amazed. This was the smallest diode chip I have ever seen: about the size of a grain of sand!

When I disassembled the radio, the battery hatch cover had a wrist watch band type rod to hold it in place. Even though I was working on a piece of carpet (just to prevent this from happening) the part flew off into never-never land.

After performing the modification, I had to figure out how to reassemble the radio. I tried to use a staple as the pin. Nope: too thin and weak. So I found a large safety pin and snipped out a piece of wire. I had to cut it two more times to get the size right. Better to start off too long than too short. Saved by the safety pin! I was so pleased with myself that I tossed the safety pin in the trash. (But wait, that safety pin still had more than enough wire for a couple of more emergencies. Always think before you discard anything.)

26 As you see by the bright idea above, you never know when you will need a small screw, nut, spring, gasket, BNC pin, etc. I toss all these surplus items in a small plastic case as the junk box. Of course, I use a bigger box for the bigger items.

27 I saw a tip on TV that you can put a pair of panty hose over the end of your vacuum tool, and carefully sweep over the carpet. You just might find it. The fine screen provided by the panty hose would supposedly collect the tiny part you were searching for. Maybe you can even find other lost miniscule items. Guess I better get out the vacuum. (I shudder to think of how I can get some pantyhose.)

28 My friend asked me to help him program his VX-1R. It is a rather complex radio, and has no keypad. Of course, there is a computer program for this radio. But we did it the old fashioned way. We read the manual, and started the learning process.

I have a couple of pointers from my experience of helping him. The most important lesson I learned in working with this radio? Read the manual carefully, and then reread it. Like most of today's radios, the engineers designed the radio so that operates with just a quick tap of the key. I mean really quick. For other functions, you need to hold the key as instructed, usually for two seconds or more. That is the idea: quick taps or long presses.

29 While doing yet another repair job, I encountered anther problem. A small Phillips screw was not coming out. Careful or you strip it! I have a small screwdriver that is my most valuable tool. It perfectly fits the super-small Phillips type screws. I use it in my right hand to hold the screwdriver in the middle of my palm, then I use the left hand to rotate the radio. I hold the tip of the screwdriver with my fingers to hold, and guide it in place. Thus, I can keep all the pressure on the screwdriver with maximum torque for the job. Just remember to use the best small Phillips screwdriver you can find, and rotate the radio, and not the screwdriver. It may not work on a large HF radio, but it does the trick for HTs, and mobiles.

30 For those of you that would like to become a ham, it is a good time to study for ham test. Why? The current pool of no-code Technician Level questions is only good through June 30, 2003. Better study now, as the question pool never seems to get shorter or easier.

31 As an amateur radio operator, I sometimes need to use the accepted symbol for zero in someone's callsign so it is not confused with the letter "O". The zero numeral designator is used for the states in the upper Midwest, specifically; ND, SD, NE, CO, KS, MO, IA, and MN. Here is the solution: type 0216 while holding down the Alt key. A second solution; in your word processor from the main menus, choose *Insert*, then *symbol*, and select "Ø" from among the many choices. If either of these two processes results in a different symbol or size, use the one that best suits. You can also change the font size or make it bold if necessary. If you use this symbol often, you can write a macro or create a new menu shortcut in your word processor.

That is all for this month. Keep listening. Look for me at the Seattle conference.

Robert Wyman
robertwyman@monitoringtimes.com

An Avalanche of Frequencies

Scanner hobbyists who follow the technical and political side of the radio spectrum are aware that radio frequencies have become a valuable and commercial commodity. With all the auctions, deals, investments, legislation and back-room politics, we may as well have a "New York Frequency Exchange" in addition to the Stock Exchange!

There is no shortage of new frequencies, bandplans and industry-specific allocation lists being discussed on a daily basis. For some, these discussions relate to monetary income as segments of the radio spectrum are marketed, sold and managed. For others, the subject is a source of concern and potential expense. Some government agencies and private firms with large radio inventories may be forced to re-tune or completely replace existing radio systems if proposed bandplan changes are enacted.

For example, the Wackenhut company, a security firm with operations throughout the world, uses many radio systems and frequencies as part of their facility protection services. If a radio system is forcibly changed as a result of legislation, the company may incur large and unforeseen expenses. Wackenhut has filed a comment with the FCC about how such a system change will adversely affect their business.

"A potential disruption...could have serious or even life-threatening consequences," Wackenhut reported in a recent article*. Bandplan changes "must be accompanied by explicit rules to ensure that systems do not suffer any service interruptions or 'down time' during the retuning or relocation process. Among the necessary safeguards would be provisions that enable licensees to implement duplicate or redundant equipment where necessary to prevent such disruption and to obtain reimbursement for any reasonable costs incurred there from."

The Wackenhut radio system cited in the FCC comment includes a communications center, over 800 portable radios and a radio infrastructure of repeaters, consoles and related equipment. The system is valued at $1.5 million and retuning may cost as much as $125,000.

* Quotes and source materials from "Security firm wants safeguards in move to reconfigure 800 MHz band," *Mobile Radio Technology* magazine, Don Bishop (author); Used with permission.

Nevertheless, new radio frequencies on existing bands are being approved and implemented at a rapid pace, regardless of whether a forced reallocation is on the horizon. Here is a brief sampling of new radio licensees, informal application comments and frequencies from around the United States. Note that some systems may already be in use, while others may only be in the planning stages. Conventional and trunked systems are represented, as well as new narrowband channels in the VHF-High band. Please send me your reception reports for these and other radio systems around the country and the world.

UNION CITY, NJ
[applicant is union city and will use the radios for official public safety activities]
866.35, 867.1625, 868.1875, 868.2125, 868.4, 821.35, 822.1625, 823.1875, 823.2125, 823.4

ALASKA, STATE OF
ANCHORAGE, AK
[applicant is a state government. radios will be used to coordinate personnel and activities]
856.2625, 857.2625, 858.2625 ,859.2625, 860.2625, 866.05, 866.1, 866.35, 866.4, 866.6, 855.7125 , 860.2125, 866.45, 811.2625, 812.2625, 813.2625, 814.2625, 815.2625, 821.05, 821.1, 821.35, 821.4, 821.6, 810.7125, 815.2125, 821.45

NEVADA, STATE OF
CARSON CITY, NV
[expansion of the nevada shared radio system that supports multiple state and local governmental agencies that include: nevada dept. of trans., univ of nv, nv national guard, city of north las vegas and washoe co.]
866.225, 866.7, 867.75, 868.1625, 868.7125, 866.075, 866.425, 866.825, 867.2, 867.425, 868.1, 868.3625, 868.625, 866.2875, 866.875, 867.325, 868.2375, 868.525, 868.8

MESA, CITY OF
MESA, AZ
[applicant is a local government entity. frequencies will be used in connection with the conduct of official city activities.]
867.1, 867.125, 867.25, 867.3, 867.425, 867.6, 867.675, 867.75, 867.825, 867.9, 868.05, 868.2, 868.275, 868.35, 868.5, 868.525

CITY OF CONROE
CONROE, TX
[applicant is a governmental agency proposing to use radios for public safety communications]
866.35, 867.1, 867.85, 868.35, 868.6875

DELAWARE, STATE OF
DOVER, DE
[applicant is a government entity which provides police, fire and paramedical services to the citizens of delaware]
866.3, 866.65, 866.825, 867.125, 867.3, 867.6625, 868.325, 868.5, 821.3, 821.65, 821.825, 822.125, 822.3, 822.6625, 823.325 ,823.5

TACOMA, CITY OF
TACOMA, WA
[applicant is a city government and will use radios to coordinate activities]
866.7875, 866.8125, 866.8375, 866.8625, 867.1625, 867.1875, 867.2125, 867.2375, 867.2625, 867.4625, 867.95, 867.9875, 868.25, 868.325, 821.7875, 821.8125, 821.8375, 821.8625, 822.1625, 822.1875, 822.2125, 822.2375, 822.2625, 822.4625, 822.95, 822.9875, 823.25, 823.325

San Diego, County of - Sheriff
San Diego, CA
[applicant is a governmental entity. will provide regional communications for public safety and regional operations.]
856.175, 856.2, 857.175, 857.2, 858.175, 858.2, 859.2, 860.2, 860.225, 861, 861.15, 861.2, 861.5, 862.15, 862.2, 863, 863.15, 863.25, 864.25, 865

ROCKWALL, CITY OF
ROCKWALL, TX
[will be used in the official duties of a governmental entity including dispatching for police, fire, and public works personnel]
453.225, 453.8, 458.225, 458.8

COLORADO, STATE OF
DENVER, CO
[part of the colorado statewide digital trunked radio system]
866.7375, 867.15, 867.7125, 868.175, 868.875, 821.7375, 822.15, 822.7125, 823.175, 823.875

OHIO, STATE OF
COLUMBUS, OH
[state agency responsible for providing statewide public safety communicaitons]
866.1875, 867.7375, 868.625, 868.9125, 821.1875, 822.7375, 823.625, 823.9125

COUNTY OF MONTGOMERY
CONROE, TX
[applicant is a governmental agency proposing to use radios for public safety communications]
866.325, 866.775, 866.825, 867.25, 867.3, 867.325, 867.775, 867.8, 868.275, 868.8375, 867.275

ASHFORD, CITY OF
ASHFORD, AL
[applicant is a government entity. radios will be used for government related activities, police, fire, sheriff]
855.2125, 858.9875, 860.4625, 810.2125, 813.9875, 815.4625

COLLEGE STATION, CITY OF
COLLEGE STATION, TX
[radios will be used to support the official activities of a municipal entity.]
460.25

TRAVIS COUNTY OF, Austin,
[applicant is a government entity]
867.875, 868.225, 868.5, 868.925

PENNSYLVANIA COMMONWEALTH OF
HARRISBURG, PA
[applicant is a government entity]
866.6875 ,867.0375, 67.0875, 867.5625, 868.15, 868.4, 868.65, 867.875, 868.55, 867.225, 867.55, 867.8375, 868.1, 866.0875, 866.5625, 866.1375, 866.3875

MINDEN, CITY OF
MINDEN, LA
[applicant is a city government. radios will be used to coordinate personnel and activities]
857.4875, 858.4875, 859.4875, 860.4875, 812.4875, 813.4875, 814.4875, 815.4875

UNIVERSITY AND COMMUNITY COLLEGE SYSTEM
LAS VEGAS, NV
[expansion of the nevada shared radio system that supports multiple state and local govt agencies that include nv dot, univ of nv, nv power, nv national guard, city of north las vegas, sierra pacific power and gaming and control board]
855.2375, 857.2625, 859.4875, 859.9875, 860.4625, 810.2375, 812.2625, 814.4875, 814.9875, 815.4625

AMHERST, COUNTY OF
AMHERST, VA
[county wide public safety]
854.9875, 855.4875, 858.2125, 809.9875, 810.4875, 813.2125

SOUTH DAKOTA, STATE OF
PIERRE, SD
[state government providing police, fire and ems services to the public]
159.93, 160.2, 150.905, 150.98

CHESTER COUNTY OF
WEST CHESTER, PA
[the applicant is a government entity]
866.0625, 866.125, 866.2125, 866.3875, 866.6125, 866.75, 866.8625, 867.325, 868.1125, 868.2625 , 821.0625, 821.125, 821.2125, 821.3875, 821.6125, 821.75, 821.8625, 822.325 , 823.1125, 823.2625

EAGLE, COUNTY OF
EAGLE, CO
[we are in the county sheriff department. and we will use radios to better coordinate our activities]
856.9625, 857.9625, 858.9625, 859.9625, 860.9625, 811.9625, 812.9625, 813.9625, 814.9625, 815.9625

MORRIS, COUNTY OF
MORRISTOWN, NJ
[applicant provides public safety services to morris county n.j.]
477.925, 478.15, 478.45, 478.475, 478.625, 478.675, 477.05, 477.075, 477.7, 478.65

ST PETERS CITY OF
ST PETERS, MO
[police dispatch and public works activities]
866.7625, 867.4625, 867.975, 868.35, 868.7125, 821.7625, 822.4625, 822.975, 823.35, 823.7125

STATE OF ARKANSAS
LITTLE ROCK, AR
[government entity law enforcement in the state of arkansas by the arkansas state police]
856.7625, 857.7625, 858.7625, 859.7625, 860.7625, 856.9375, 857.9375, 858.9375, 859.9375, 860.9375, 856.8125, 857.8125, 858.8125, 859.8125, 860.8125

SIMPSON, COUNTY OF - SHERIFF'S DEPARTMENT
MENDENHALL, MS
[applicant is a county of the state of mississippi]
155.0925, 155.8875, 154.0325, 155.0025, 153.8525, 153.9275, 158.8725, 158.9325

ORANGE COUNTY OF CA
ORANGE, CA
[in accordance with section 90.617 of the fcc rules and regulations]
866.2125, 866.7125, 867.2125, 867.7125, 868.2125, 868.3125, 868.7125, 868.9625, 821.2125, 821.7125, 822.2125, 822.7125, 823.2125, 823.3125, 823.7125, 823.9625

SOUTH CAROLINA BUDGET & CONTROL BOARD
COLUMBIA, SC
[state agency providing public safety dispatch statewide]
866.0625, 866.6125, 868.3, 821.0625, 821.6125, 823.3

EWING, TOWNSHIP OF - POLICE DEPARTMENT
EWING, NJ
[governmental entity providing communications for public safety]
507.3, 507.575, 507.725, 508.6, 508.7, 508.875, 510.3, 510.575, 510.725, 511.6, 511.7, 511.875

Port Authority of New York and New Jersey
Newark, NJ
[testing associated with the official public safety activities of the applicant.]
866.4125, 867.7875, 821.4125, 822.7875

ALBEMARLE, COUNTY OF
CHARLOTTESVILLE, VA
[applicant is a government entity. communications facilities to be used in connection with the official public safety activities of the applicant \]
866.05, 868.5625, 868.65, 868.8125, 868.9, 868.9875, 821.05, 823.5625, 823.65, 823.8125, 823.9, 823.9875

CITY OF GAINESVILLE
GAINESVILLE, FL
[applicant is the city of gainesville radios will be used to coordinate personnel and activities]
866.0875, 866.1875, 866.775, 867.1875, 867.275, 867.5625, 867.6875, 867.775, 867.8125, 868.0625, 868.3125, 868.525, 868.5625, 868.675, 868.775, 868.8125

ALACHUA COUNTY
GAINESVILLE, FL
[applicant is the county of alachua radios will be used to coordinate personnel and activities]
866.1375, 866.4125, 866.6375, 866.6625, 866.9125, 867.05, 867.3, 867.4125, 868.1125, 868.1875, 868.3625, 868.8625

GUAYNABO MUNICIPALITY OF
GUAYNABO, PR
[applicant to use system for police dept communications]
856.9625, 857.7125, 858.9625, 859.9625, 860.9625, 811.9625, 812.7125, 813.9625, 814.9625, 815.9625

WISCONSIN, STATE OF
MADISON, WI
[applicant is the state of wisconsin. radio will be used to coordinate law enforcment and govt operations.]
453.1625, 453.4625, 453.7375, 458.1625, 458.4625, 458.7375

DOUGLAS, COUNTY OF
OMAHA, NE
[government public safety]
866.2375, 866.275, 866.5375, 866.5625, 866.5875, 866.7875, 866.95, 867.225 ,868.2125, 868.45, 868.475, 868.5125, 868.7, 868.725, 868.7625, 821.2375, 821.275, 821.5375, 821.5625, 821.5875, 821.7875, 821.95, 822.225, 23.2125, 823.45, 823.475, 823.5125, 823.7, 823.725, 823.7625

RIVERSIDE, COUNTY OF
RIVERSIDE, CA
[county government, for official activities of the county.]
866.2375, 866.2875, 866.7375, 866.7875, 867.2375, 867.2875, 867.7375, 868.2375, 868.2875, 868.7375

RIO GRANDE CITY C.I.S.D. POLICE DEPARTMENT
RIO GRANDE CITY, TX
[coordinate personnel & vehicle officers]
857.025, 858.025, 859.025, 812.025, 813.025, 814.025

WELLSVILLE, VILLAGE OF
WELLSVILLE, NY
[coordinate daily village public safety operations]
154.295, 155.88, 153.9275, 155.0475, 155.4075, 158.805, 158.775, 156.0075, 158.8275, 158.7525

THE SCHOOL BOARD OF BROWARD COUNTY, FLORIDA
SUNRISE, FL
[public safety, school district]
866.1875, 866.6875, 867.0375, 867.7125, 868.0625, 868.1875, 868.7625

CUMBERLAND, COUNTY OF - OFC OF EMERGENCY PREPAREDNESS
CARLISIE, PA
[public safety communications for police, fire, and emergency medical service and for cumberland county.]
857.2375, 859.9375, 860.7375, 859.4375

HOWARD COUNTY OF
ELLICOT CITY, MD
[the applicant is a government entity]
856.2375, 856.7375, 857.2375, 857.7375, 858.2375, 858.7375, 859.2375, 859.7375, 860.2375, 860.7375

GLYNN, COUNTY OF
BRUNSWICK, GA
[applicant is a county government. radios will be used to coordinate personnel and activities]
866.0375, 867.775, 868.5875, 868.8625, 821.0375, 822.775, 823.5875, 823.8625

CITY OF BIXBY
Bixby, OK
[applicant is operating a communications radio system for the public safety entities of bixby, broken arrow, and glenpool.]
866.325, 866.85, 867.375, 868.1625, 868.7125, 821.325, 821.85, 22.375, 823.1625, 823.7125

FLORIDA, STATE OF
TALLAHASSEE, FL
[state govt agency official law enforcement activities]
853.925, 853.95, 854.075, 854.1, 853.975, 854.125, 854.0375, 853.85, 853.8875, 853.9125, 854.0625, 854.0875

NEW YORK STATE OF, OFFICE OF TECHNOLOGY
ALBANY, NY
[this applicant is a governmental entity.]
851.0125, 851.0375, 851.0625, 851.0875, 851.1125, 851.1625, 851.1875, 851.2125, 851.2375, 851.4875, 851.5125, 851.5375, 851.5625, 851.5875, 851.6625, 851.9125, 851.9375, 851.9625, 851.9875, 852.0125, 852.0625, 852.1125, 852.1375, 852.3625, 852.3875, 852.4125, 852.4625, 852.4875, 852.5625, 852.5875, 852.8125, 852.8375, 852.8625, 852.9125, 852.9875, 853.0125 ,853.0375

John David Corby, VA3KOT
johncorby@monitoringtimes.com

Ham-Ex, Canada's "Dayton North" The Little Hamfest That Grew

A few years ago, as a humble SWL and scanner operator, I started attending a local ham flea market held every March by the Peel Amateur Radio Club in Brampton, Ontario. Brampton is a rapidly growing city in the northwest suburbs of Toronto and the home of many active amateur radio operators. Year by year the local flea market grew in popularity and size. Quickly outgrowing its former home in a city recreation center, it had to find new accommodation.

Coincidentally, the city of Brampton had also outgrown its fall fair premises and built a spacious new, modern facility in the Town of Caledon. The Province of Ontario had also recently completed construction of the new highway 410 linking Brampton to a network of major highways reaching to Montreal in the east and the US border in Niagara frontier country.

All the ingredients were falling into place for a major development in the local ham scene. The Peel Amateur Radio Club joined forces with the Mississauga Amateur Radio Club to put forward a bigger local amateur radio event. The results were encouraging; attendance soared and the local flea market was reborn as a major event on the Canadian amateur radio calendar. But still, months of preparation and much anticipation was dissipated in an event that lasted only half a day. All the events were squeezed into a session lasting only until lunchtime. As the lunch bell rang, an armada of callsign license plates and car roof antennas hit the highways and the dust settled on another year's event.

The organizers decided that they had the makings of a northern version of the internationally famous Dayton Hamfest on their hands. With ambition swelling, the two southern Ontario ham clubs made a conscious decision to re-engineer the event and create a true "Dayton North." A charter was drafted and put to a plenary vote at both clubs – where it passed easily. The result is a reborn "Ham-Ex" to be held this month, on Saturday March 22nd 2003, at the Brampton Fall Fairgrounds on Heart Lake Road in Caledon, Ontario.

This year's Ham-Ex will last a whole day and it is expected to be a major draw for hams, SWLs and scanner owners from all over eastern Canada and the northern border states. Doors open to the public at 9:00 am for the largest ham radio flea market in Canada. There is an exhibit and demonstration area featuring AMSAT, ARES, the Ontario DX Association, digital modes and other displays. All the local commercial vendors and a number of manufacturers attend Ham-Ex and offer attractive special deals. This year vendors will even come from as far away as Montreal.

Radio Amateurs of Canada (RAC) examiners will be at Ham-Ex to conduct exams at the Basic, Morse Code and Advanced level and there will be a RAC QSL bureau present. This could be your opportunity to take your scanning hobby one step further by getting your amateur radio license.

In the afternoon the flea market will give way to a series of seminars conducted by popular and carefully selected speakers from the ham radio community. As the deadline for this column looms, the seminar schedule has not been finalized but some very high profile appearances are being combed through the selection process.

The day ends with a gala banquet to which all are invited. Tickets for the banquet will be sold in advance and on the day of the event, but ticket quantities are limited. Talk-in will be on the two clubs' 2-meter band repeaters VE3PRC (146.88-) and VE3MIS (145.43-).

The Brampton Fall Fairground can be reached by following Highway 410 north until it ends, and then further north for a few kilometers until you see the signs. Updated information on the event is available at **http://www.peelarc.org**. *ScanCan* will be at the event; I hope to meet some *MT* readers there, too.

Pavilion Passenger Rail Station

❖ A Monitoring Loss in Ontario

A reader wrote to *Scanning Canada* to report an announcement by Industry Canada of a major move of Ontario's public utility radios to a new, digital trunked system operated by Bell Mobility. The 15-year project for the conversion has already begun and involves the Ontario Provincial Police, and four provincial ministries – Correctional Services, Health (ambulance services), Natural Resources (forest firefighting), and the Ministry of Transportation. The new technology platform is the Motorola SmartZone system and will be used for voice and data services.

This move will take a large bite out of Ontario's scanning spectrum, but will still leave many local police and other services on in-the-clear VHF frequencies.

❖ The Loneliest Railway Station in Canada?

A final note from last summer's *ScanCan* tour of British Columbia. As I descended a particularly precarious and winding section of road hugging the rim of the Fraser River Canyon I came across a lonely shelter alongside the BC Rail tracks deep in the mountains. I pulled over and took this month's picture of the Pavilion passenger rail station. Readers who may be more familiar with Union Station in Toronto, Grand Central in New York City, or the huge rail terminals of Europe, may share my affection for this lonely little whistle stop in the backwoods of Canada.

Frequency List for Pavilion BC

Pavilion is an Indian reserve in the mountains of British Columbia. It is remote, unincorporated and no more than a very small dot on the provincial map. This month's frequency list is rather slim as a result. Nonetheless, if you are touring in the area, check out these frequencies.

Lillooet Tribal Council–Pavilion Band: 154.31, 154.98, 163.575
BC Rail: 411.5875

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AR8200IIIB		SCN51	$589.95
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www.ominous-valve.com/uteworld.html

A Marriage Made in Cyberspace

Many people wonder if the Internet will replace shortwave high frequency (HF) radio at some future time. Not if Winlink 2000 is any indication. Born of the marriage of HF and the Internet, Winlink 2000 is an example of what the future generation of HF communications may be like.

Winlink 2000, called WL2K in radio's acronym-heavy jargon, is almost completely an amateur effort. It has created a global network using ham radio stations and gateways to the Internet. Through the tireless efforts of such dedicated programmers as Vic Poor, W5SMM, it has continuously improved speed and transparency to users, while adding useful features to its basic capability of HF e-mail.

A growing number of recreational boaters and back-country explorers have obtained amateur radio licenses for the express purpose of staying in touch via Winlink. While ham radio is not really a utility, the amateurs continue to evolve techniques that quickly migrate into the commercial telecom industry. Therefore, some familiarity with the ham digital system is very nice to have.

Being amateur, Winlink is unencrypted, and users are reminded that ham radio is still by nature a very public medium. Needless to say, this allows monitoring with appropriate equipment. Simple hobby software, with a minimal capability for PACTOR (Packet Teleprinting Over Radio), can usually at least pick out the callsigns, allowing DXing of the system.

Internet From Radios

The radio user needs the full PACTOR setup described last month's *Utility World* column, plus a suitably interfaced Windows computer running the AirMail program. Once everything's working, the user can call up one of 33 worldwide network nodes, which the jargon calls PMBOs (Participating Mail Box Operators).

PMBOs are merely ham radio stations running the Winlink system into Internet gateways. About two thirds of them can move e-mail onto and off of the Internet at speeds similar to those seen by normal landline users. This, my friends, is *fast*.

This accelerated throughput has allowed direct access to the system from landline computers with World Wide Web browsers or even simple "Telnet" terminal programs. This software enables file transfers along with simple text mail, within amateur regulations.

This column doesn't have space for all of the Winlink frequencies. Fortunately, anyone interested probably has a computer. Just go to **http://users.mweb.co.za/z/zs/zs5s/bulls/PMBO.TXT** and get the regularly updated file.

Radios from Internet

Internet is an integral part of the Winlink system, as the PMBO stations use landlines for network forwarding and all other possible traffic. This saves air time, and also allows some very transparent features. For example, e-mailing a radio station is done exactly the same way as sending any other net mail.

The Web access allows members to obtain accounts that will let them answer their mail from landlines. For example, if they did not want to transmit in some strange place, there is still the option of plugging into a hotel room or going to a net café.

Another slick feature is updating mobile station positions worldwide via the amateur Automatic Packet Reporting System (APRS). Mobiles with the proper equipment can automatically put fixes from Global Positioning System receivers into the system for anyone to see. It's rather amazing to connect to the web and watch positions of vehicles in some very remote areas change on the map. Beyond the hobby aspect, though, this is obviously a lifesaving potential.

❖ Even More Antarctica

We got a nice letter from Bruce Blackburn, N0NHP, a senior tech at Raytheon Polar Services. He passed along many updates to the information in January's column, just in time for the final weeks of the 2003 Antarctic summer season.

For a start, NNN0ICE has been gone since 1998, when the US Navy pulled out of McMurdo. There is still a ham radio there, but it's no longer in the Military Affiliate Radio System (MARS).

The remaining US military presence is seasonal. Currently it's the 109th Air National Guard, out of New York state, and the US Coast Guard "Deep Freeze" operation we have mentioned. C-130 aircraft with landing skis continue to use the callsigns SKIER and ICE. KIWI is used by wheeled New Zealand C-130s, and KB is Ken Borek's Twin Otter.

The 10-kilowatt transmitters were scrapped in the late '80s, and the major activity is now on 9032 kHz USB with 5000 watts. Other stations have 500 or 1000 watts.

Incidentally, an Argentine travel company called AeroRed offers day trips to Antarctica twice a week during the summer. Adventurers can fly the 625 miles (1000 kilometers) from Tierra Del Fuego, take a three-hour tour of Argentina's Marambio research station, and return. Summer high temperatures on this island base are nice and toasty, right up around freezing.

We wrap up this month's column with a few of the more audible frequencies from the Antarctic coordination list. Stay warm!

Antarctic Frequency List

All frequencies are upper sideband (USB), shown as assigned channels in kilohertz (kHz). On most radios, they will be different from the "dial/window" readings. If the digit after the decimal point is 0, tune down 2 kHz. If 4, subtract 1.4 kHz, and if 5, 1.5. For example, 5697.5 is really the well-known Coast Guard channel on 5696.0 kHz.

Base station power is in kilowatts (kW).

Frequency	kW	Use
2026.4	1	Ship tactical/conference
2183.4	var	International calling/distress
2515.0	1	Air/ship
3248.4	1	Ship tactical/conference
3320.4	1	Ship tactical/conference
4127.0	var	International calling/distress
4719.5	1	Long range air/ground
4771.5	.5	Common
5697.5	1	US air/ship (Coast Guard)
5727.5	1	Long range air/ground
6709.5	1	Long range air/ground
7996.5	1	Common
8298.4	1	Ship tactical/conference
8364.0	var	International Search & Rescue
8420.0	.5	McMurdo ship to shore
8999.5	1	Long range air/ground
9007.5	1	Common
9032.0	5	Long range air/ground
10641.0	5	McMurdo air/ground weather net
11256.5	1	Long range air/ground
11554.5	.5	Common
12222.0	5	Air/ground weather net
12354.4	1	Ship tactical/conference
12630.0	.5	Ship/shore coordination
13252.5	1	Long Range air/ground
14700.0	5	Air/ground weather net
16529.4	1	Mobile stations

Utility World

Utility Logs

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ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARINC	Aeronautical Radio, Inc.
ARQ	Automatic Repeat Request teleprinting system
ASECNA	Africa/Madagascar Air Safety Agency
AWACS	Airborne Warning And Control System
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
Coq-8	8-tone Algerian "Coquelet" teleprinting system
CW	Morse code telegraphy ("Continuous Wave")
DEA	Drug Enforcement Administration
DSC	Digital Selective Calling
E3	British MI6/SIS, Cyprus, Poacher tune
E10	Israeli phonetic English female numbers
E10a	Israeli phonetic numbers, callup only
EAM	Emergency Action Message
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
HFDL	High-Frequency Data Link (air digital system)
HF-GCS	High-Frequency Global Communications System
JSTARS	Joint Surveillance Target Attack Radar System
M21	Russian time-stamped air defense observations
M8	Cuban CW, "cut numbers" ANDUWRIGMT
M8a	Three-message case of above
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
M/V	Motor Vessel
MX	Russian single-letter CW marker, not clustered
Navtex	Navigational Telex; automated bulletins
PR	Puerto Rico
RSA	Republic of South Africa
RTTY	Radio Teletype
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
V2	Cuban Spanish female, "Atencion!" callup
V2a	Three-equal-message case of above
VOLMET	"Flying Weather;" Aviation weather broadcasts

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

518.0 D-Coruna Radio, Spain, Navtex in SITOR-B, at 0030. L-Limnos Radio, Greece, Navtex at 0150. N-Orlandet Radio, Norway, Navtex at 0210. N- Alexandria Radio, Egypt, Navtex at 0212. C-Odessa Radio, Ukraine, Navtex at 0230. V-Coast Guard Augusta, Italy, Navtex at 0330. X- Reykjavik Radio, Iceland, Navtex for Greenland at 0350. K-Kerkyra Radio, Greece, Navtex at 0540. (Ary Boender-Netherlands) ZSC-Capetown Radio, RSA, Navtex at 1225. (Bob Hall-RSA)

2670.0 Coast Guard Group Cape Hatteras-US Coast Guard, NC, with information bulletins at 0135. (Ron Perron-MD)

3322.0 Unid-Russian military "Time Stamp Station" (M21), automated CW data messages, lots of ? characters, at 2247. (Day Watson-UK)

3336.2 "L"-Russian Navy, St. Petersburg, CW single-letter channel marker (MX), at 2316. (Watson-UK)

4015.0 Abnormal Israeli E10 callup VLB T16R23B22, also on 5230, at 2045. (Boender-Netherlands)

4027.0 Cuban "Atencion" (V2a), AM numbers at 0203 and 0401. Cuban "cut numbers" (M8a), CW numbers at 0302. (Camillo Castillo-Panama)

4316.0 Unid-US Coast Guard New Orleans, directly simulcasting CAMSLANT Chesapeake, with voice synthesized "Perfect Paul" weather, at 0355. (Gary Neal-TX) *[Same channel used for the FAX, sometimes with a different tuning offset. The schedule was in last October's column. -Hugh]*

4430.4 Bravo Foxtrot-US Navy, link-11 control net with Lima, Golf, etc, at 0202. (Rick Baker-OH)

4479.0 Cuban "Atencion" (V2a), AM numbers at 0302. (Castillo-Panama)

4525.0 5ST-ASECNA, Antananarivo, Madagascar, aero data in RTTY, at 0036. (Hall-RSA)

4555.0 FDG-French Air Force, Bordeaux, RTTY test loop at 1931. (Watson-UK)

4739.0 Fighting Tiger 26-US Navy P-3C, clear and secure with Wafer 21 and 24, on drug patrol, at 0303. (Allan Stern-FL)

5275.0 Unid-Possible Canadian trucking business, at 2215. (Perron-MD)

5418.0 Cuban "Atencion" (V2a), AM numbers, twice at 0203. (Castillo-Panama)

5505.0 Shannon-Shannon VOLMET, Ireland, with aero weather at 0612. (Barry Williams-AL)

5680.0 Kinloss Rescue-UK Coast Guard, working Rescue 162, at 0052. (Perron-MD)

5696.0 Coast Guard 1503-US Coast Guard, relay from CAMSLANT to Coast Guard Rescue 2104. Detroit Air-USCG, MI, working Coast Guard 6553, at 1402. (Baker-OH) CAMSLANT Chesapeake-USCG, VA, radio checks with Coast Guard 40C on a DEA operation, at 2041. (Perron-MD)

5720.0 03-ARINC, Reykjavik, Iceland, logging on an aircraft in HFDL, at 2120. (Watson-UK)

5759.0 Cuban "cut numbers" (M8a), CW at 0202 and 1302. (Castillo-Panama)

5800.0 Leg Brace-US military, with a 28-character EAM, simulcast on 8992 and 11244, at 2030. (Jeff Haverlah-TX)

6491.5 LOR-Argentina Navy, Puerto Belgrano, RTTY weather in Spanish, at 0030. (Hall-RSA)

6581.0 Cuban "Atencion" (V2), 5-figure AM numbers, in progress at 0420. (Williams-AL)

6583.0 New York-New York Radio, in oceanic route control with aircraft, with interference from Cuban numbers on 6581, at 0422. (Williams-AL)

6628.0 Santa Maria-Oceanic Air Route Control, working aircraft at 0555. (Williams-AL)

6695.0 Blue Tip-US military, with EAM at 0407. (Williams-AL)

6697.0 Newscast-US military, with a 28-character EAM, simulcast on 8992 and 11244, at 0108. (Haverlah-TX)

6712.0 Circus Vert-French Air Force, Villacoublay, France, voice weather for aircraft 1042 and 418E, at 1715. (Patrice Privat-France) 03-ARINC Reykjavik, HFDL traffic at 2145. (Watson-UK)

6730.0 Primrose-Danish Air Force, weather with an unidentified aircraft, in Danish, at 1830. (Privat-France)

6770.0 Cuban "Atencion" (V2), AM numbers, in progress at 0415. (Castillo-Panama)

6779.3 DRAN-German Navy Frigate *Augsburg*, setting up secure channel with DHJ59, Wilhelmshaven headquarters, at 0615. (Baker-OH)

6784.0 Cuban "cut numbers" (M8a), CW at 1301. (Castillo-Panama)

6854.0 Cuban "Atencion" (V2a), AM numbers, twice at 0302. (Castillo-Panama)

6912.0 SYN2-Israeli Intelligence AM "numbers" (E10a), two repetitions of the callup at 0040 and 0140, then five minutes of repetition at 0045 and 0145. (Ed Walsh-AL) SYN2, (E10a), callup only at 2342. (Williams-AL) Abnormal E10 callup SYN F49G12K78, at 2045. MIW2-Abnormal E10a callup for this frequency, at 2215. (Boender-Netherlands)

6930.0 CIO2-Israeli Intelligence AM "numbers" (E10a), at 0550. (Williams-AL) Abnormal Israeli callup CIO Z9XSPH, at 1900. (Boender-Netherlands)

6933.0 Cuban "cut numbers" (M8), CW, in progress at 1229. (Castillo-Panama)

6986.0 Unid-Israeli Intelligence, 5-figure groups, in progress at 0405. (Williams-AL)

7396.9 HSW64-Bankok Meteo, with weak weather FAX at 2306. (Watson-UK)

7508.0 ZSJ-South African Navy, Silvermine, with weather FAX at 1030. (Hall-RSA)

7584.9 FDI8-French Air Force, Nice, CW marker at 2034. (Watson-UK)

7605.0 SYN2-Israeli intelligence (E10a), usually an "MIW" frequency, at 2145. (Boender-Netherlands)

7716.7 Unid-Egyptian embassy, Rome, with Arabic message in SITOR-A, mentioned frequencies 7451.7 and 9571.7, at 2046. (Watson-UK)

7771.7 Unid-Probably Argentine Navy, Buenos Aires, with FEC marine bulletins in Spanish, at 0536. (Hall-RSA)

7889.0 Cuban "cut numbers" (M8a), CW at 1201, and 5 times at 1301. (Castillo-Panama)

8178.5 Red Dragon-US military training exercise with Cajun Saint Zero plus two F-16s, probably Fort Irwin, CA, at 1530. (Haverlah-TX)

8191.7 9MR-Malaysian Navy, with RTTY world news in Malay, at 1730. (Hall-RSA)

8297.0 Unid-2 commercial vessels in offshore oil operations, at 1330. (Bob Hollifield-GA)

8414.5 Lyngby Radio, Denmark, calling vessels *Maria L* and *Stolt Markland* in DSC, at 0722. UIAO-Russian Motor Vessel *Kapitan Danilkin*, calling in DSC, at 1200. UIRU-Russian river ship *Sormovskii 3054*, DSC at 1809. UCJC-Russian Motor Vessel *Dimitrii Pojarski*, passing position in DSC, at 1809. UBAK-Russian Motor Vessel *Vityaz*, calling maritime identifier 002733744 in DSC, at 1940. (Privat-France)

8454.0 UIW-Kaliningrad Radio, Russia, with warnings in third-shift Cyrillic RTTY, at 1620. (Watson-UK)

8464.0 Lincolnshire Poacher (E3), callup 98426, also on 10426, at 1600. (Boender-Netherlands)

8921.0 Speedbird London-British Airways operation control, handling a medical emergency aboard Kestrel 867 (an Air Tours flight), at 1815. (Privat-France)

8971.0 Pelican 713-US Navy, working Fiddle, Jacksonville, FL, at 1330. (Stern-FL) Blue Star-US Navy, Puerto Rico, emergency traffic with Branch 99, clear and secure, at 1545. (Perron-MD)

8983.0 CAMSLANT Chesapeake-US Coast Guard, working Coast Guard 2133, CG 2117, and CG 2102, at 0029. (Perron-MD) Coast Guard 1711, calling CAMSLANT at 1356. Coast Guard 1503, ops-normal and position for CAMSLANT at 1358. (Hollifield-GA)

8992.0 Offutt-Offutt HF-GCS, NE, patching unheard Evergreen 471, a US Air Mobility Command contract transport to Ramstein for arrival weather, at 0722. Andrews-US Air Force HF-GCS control station, MD, patching "V-2-M" to "A-3-J" for an exercise message, at 1425. (Haverlah-TX)

9016.0 Rasputin-US military, with several 32-character EAMs, simulcast on 8992 and 11244, at 2055. (Haverlah-TX)

9057.0 Billboard-US military, with a 28-character EAM, simulcast on 6697, 8992, and 11244, at 0235. (Haverlah-TX)

10242.0 Panther-US DEA, Nassau, Bahamas, working Coast Guard 03C, also secure voice and ALE, at 1820. (Perron-MD)

11175.0 JSTARS Maintenance-Probable US military, radio check with Moffett, at 1316 (Hollifield-GA) Electric-US military, patch via Andrews for orderwire coordination, at 1555. Oiler 58-US military, patch via Puerto Rico HF-GCS to Hurlburt Command Post, at 1925. Aversion-US military, patch via Andrews for "Hip Bone" orderwire coordination, at 2007. (Haverlah-TX)

11181.0 Strikestar-US military, calling Nightstar Bravo, raised Nightstar Alpha instead, but did not answer, at 2112. (Haverlah-TX)

11202.0 CAMSPAC Point Reyes-US Coast Guard, CA, working CG 1714 at 0227. Commsta Kodiak-US Coast Guard, AK, working CG 1715, at 0228. (Baker-OH)

11226.0 MPA-US Air Force, new South Atlantic station, ALE sounding at 1829. (Hall-RSA)

11232.0 Trenton Military-Canadian forces, working Canforce 2346, at 0019. (Perron-MD)

11244.0 Proximate-US military, high-power female voice with a special message for "All Stations," no control tones on unkey, at 0030. Ancient River-US military, working Auction Block in 3rd-week-of-month "A" callword activity, at 1652. Leg Brace-US military, with an EAM simulcast on 8992, at 2055. (Haverlah-TX)

11291.0 Dakar-Area Control Center, Senegal, working aircraft at 0558. (Williams-AL)

11315.0 04-ARINC, Riverhead, NY, logging on an aircraft in HFDL, at 2155. CO0485-Continental Airlines, HFDL position at 2156. (Watson-UK)

11475.0 MAE-Algerian MFA, Algiers, ALE-initiated FAX to RBT, Rabat, Morocco, at 1458. (Watson-UK)

11545.0 Lincolnshire Poacher (E3), callup 50699, at 1400. (Boender-Netherlands)

12603.0 Lincolnshire Poacher (E3), callup 69078, also on 13375, at 1500. (Boender-Netherlands)

13110.0 WLO-Mobile Radio, AL, voice synthesized weather schedule, at 0314. (Neal-TX)

13155.0 Macintosh-US military, with an EAM simulcast on 11244, at 1630. (Haverlah-TX)

13215.0 MPA-New US Air Force South Atlantic ground station, sounding in ALE at 0659. (Hall-RSA) 160013-US Air Force C-5, ALE sounding at 1429. (Watson-UK)

13527.9 "S" Russian Navy single-letter beacon (MX), Arkhangelsk, also on 16331.9 and 20047.9, at 1206. (Boender-Netherlands)

13850.0 PAR-Rockwell/Collins, sounding in ALE at 1302 and 1347. (Watson-UK)

13900.0 DG-Moroccan Ministry of Information, ALE sound in LSB at 1251 and 1321. (Watson-UK)

13907.0 Service Center-US Customs Service, clear and secure, at 2243. (Perron-MD)

13927.0 Razor 24-US Air Force E-8 JSTARS, patch to Raymond 19, at 1540. (Stern-FL)

14467.3 DDH8-Hamburg Meteo, Germany, with coded RTTY weather observations at 1156. (Watson-UK)

14481.7 RFTJ-French Forces, Dakar, Senegal, with encrypted ARQ traffic and plain French, at 1203. (Watson-UK)

14487.0 Lincolnshire Poacher (E3), callup 29372, also on 15682 and 16084, at 1300. (Boender-Netherlands)

14585.7 Unid-French Forces, possibly N'djamena, Chad, ARQ at 1514. (Watson-UK)

14867.7 RFKFS-Egyptian embassy, Harare, Zimbabwe, Arabic ARQ traffic to MFA Cairo, at 1621. (Hall-RSA)

15016.0 Razor 22-US Air Force JSTARS, interrupted by Andrews with an EAM at 1330. (Stern-FL)

16706.5 UDEM-Russian Motor Vessel *Ilya Erenburg* working Novorossiisk Radio with SITOR-A Telex, at 1030. (Privat-France)

16830.5 SVO-Olympia Radio, Greece, with SITOR-A messages in Greek and English, at 1546. (Hall-RSA)

16904.7 RFQPME-French Forces, Djibouti, RTTY test loop at 1251. (Hall-RSA)

16975.7 PWZ33-Brazilian Navy, Rio de Janeiro, with RTTY ship movements in English, at 0500. (Hall-RSA)

17147.0 URL- Sevastopol Radio, Russia, with holiday greetings to Namibian fishing vessels in RTTY, at 1520. (Hall-RSA)

17441.6 5YE-Nairobi Meteo, Kenya, with RTTY aviation weather observations, at 1236. (Watson-UK)

17550.9 RFTJ-French Forces, Dakar, Senegal, with ARQ control messages at 1257. (Watson-UK)

18529.4 Unid-Algerian embassy, Baghdad, Iraq, French traffic in Coq-8, at 1127. (Watson-UK)

18667.7 Unid-Egyptian MFA, Cairo, encrypted traffic and Arabic chatter in SITOR-A, at 0925. (Watson-UK)

19698.0 OST69-Ostende Radio, Belgium, with CW identifier in SITOR-A sync marker, at 1605. (Hall-RSA)

19977.0 ASI-UK Military/diplomatic, sounding in ALE at 1304. (Hall-RSA)

20602.0 AMM-UK military/diplomatic, Amman, Jordan, ALE sound at 1044. KUW, Kuwait, ALE sounding at 1051. ANK, Ankara, Turkey, sounding at 1103. (Watson-UK) ASI-UK military/diplomatic, sounding at 1420. (Hall-RSA)

20631.0 440190-US Air Force tanker, ALE sounding at 1122 and 1250. DVL-Unknown USAF, sounding at 1257. (Watson-UK)

20890.0 CS1-US Customs Service, ALE sound at 1224. R25, US Customs, sounding at 1227. (Watson-UK)

20917.5 S00-Swedish MFA, Stockholm, calling S72, Kinshasa, Republic of the Congo, in ALE at 1435. (Watson-UK)

20942.0 S00- Swedish MFA, Stockholm, calling S97, Abidjan, Ivory Coast, ALE at 1409. (Watson-UK)

20995.0 KAH-Slovakian embassy, Cairo, Egypt, ALE soundings at 1229 and 1328. (Watson-UK)

22847.5 CPK-Globe Wireless network node, Santa Cruz, CW identifier and working ships in GlobeData, at 1035. (Watson-UK)

23150.0 WPC-SeaWave, Middletown, NY, CW identifier every 3 minutes, starting at 1538. (Watson-UK)

23337.0 JDG-US Air Force, Diego Garcia, ALE sounding at 0917. (Hall-RSA)

24370.0 P6Z-French MFA, Paris, idling in FEC at 1050. (Hall-RSA)

25350.0 Unid-US Customs, clear and secure voice, also ALE, at 2154. (Perron-MD)

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New Egyptian Hieroglyphics

This month we take a look at developments in one of the most long-standing diplomatic networks on shortwave, that of MFA Cairo. We also cover a new network build-out at commercial ISP-at-sea provider SeaWave and an update to our coverage of the Mexican Army's extensive ALE networks.

New Egyptian Diplomatic Encryption Scheme

Even the most casual of utility listeners can't fail to have come across the SITOR-A signals of MFA Cairo. A perennial since the early seventies, the Egyptians have kept the same equipment and operating habits for three decades.

While we know that they have dabbled with various new technologies, most notably the Codan 9000-series 16 tone modems, these forays appear to have been brief experiments as the SITOR signals remain on today's airwaves on a daily basis.

With this seemingly stable set of habits, it was interesting to note a new encryption scheme coming into operation in November 2002. As this extract from a recent message shows, the scheme uses a 5-letter hexadecimal format:

From: 71
To: Berlin
Time & date: 15:51, Thursday, November 21, 2002
Number of groups: 134
Urgent
= = = = = =
00euo a8b01 e0085 61500 56e43 08d60 97b6f 4bc8b 80581 2537f cc010 1001b 97d58 0902e e737e e5c82 d97b9 3786a cc039 ccef7

It is also interesting to note that all senders of the messages appear to be the intelligence departments, differentiated from regular traffic by the numerical addressing scheme. With this new scheme, traffic was seen being sent to places as diverse as London, Washington, Rabat and Berlin. Perhaps these are new posts at key embassies, or was their old encryption scheme compromised in some way?

For full details on the Egyptian Diplomatic operations on HF, see the profile at Utility Monitoring Central.

Network Build-out at SeaWave?

In early December 2002, during some late night monitoring, we happened to stumble on a new channel marker signal at the top end of 5 MHz. At first, the 100bd channel free or idle signal resembled that sent by the familiar and extensive network of Globe Wireless stations (see *MT* Oct 2002 for details), but something was clearly different.

Eventually, the marker sent a CW identification "WPC," identifying the station as belonging to the established ISP-at-sea operation SeaWave (recently renamed from Pin Oak Digital). Checking the website shows that the company appears to have been undergoing what the marketing types would call something of a re-branding. There are also details of new software, ALE (automatic link establishment) capabilities, and an extensive global array of stations accompanied by a map, although the website provides few details on any of these topics nor the locations or operational status of the global sites.

As we often do in the case of companies operating from the US, we checked the FCC database (see Resources). This revealed the new frequencies running the different channel free signal and also new sites.

Frequencies:
2651.4, 3165.5, 3175.5, 3245.5, 3345.5, 4455.5, 4551.4, 4555.5, 4765.5, 5150.5, 5355.5, 5851.4, 5910.5, 6855.5, 7565.5, 7665.5, 7951.4, 8025.5, 10965.5, 11065.5, 13420.5, 13560.5, 13965.5, 18270.7, 18370.5, 20045.5, 23150.5kHz

Callsigns & Locations:

KFW	Linn, TX
KWS585	Thomasboro, IL & Gladstone, NJ
WPC	Mapleville, RI
WPUA345	Mapleville, RI
WPWB695	Linn, TX

Incidentally, while we're on the subject of the excellent FCC database, it's worth mentioning that the system now sports a very useful "save to PDF" option. This means that one can ask the system to generate an Adobe PDF (Portable Document Format) file of your search, which can then be downloaded and reviewed at your leisure. Since PDF viewers are available for just about every type of operating system, it makes sharing the information that much simpler, too.

More Mexican Military

Our Spanish dictionary was somewhat broken when we published details of the various Mexican Army nets. Since that time, more frequencies have come to light, in addition to another network which uses names of countries. Most of the networks carry voice traffic, either plain or encrypted with the Harris AVS (Advanced Voice System). Here are the updated details:

Metals/Stones Net:
Frequencies: 5260, 5590, 8050, 8084, 9080, 10444kHz (USB)
Identifiers: Acero, Bronce, Cobalto, Cobre, Diamante, Jade, Marmol, Oro, Plata

Planets/Earth Net:
Frequencies: 7900, 8065, 9060, 10135, 14400, 14715kHz (USB)
Identifiers: Arbol, Europa, Galaxia, Marte, Planeta, Universo, Valle, Venus

Animals Net:
Frequencies: 7900, 8047, 9060, 10135kHz (USB)
Identifiers: Faisan, Jaguar, Jilguero, Leon, Leopardo, Salmon, Tauro, Tiburon, Tigre, Zorro

Countries Net:
Frequencies: 4550, 8020, 8065kHz (USB)
Identifiers: Alemania, Espana, Francia, Israel, Italia

Regional Nets:
Frequencies: 4650, 7777, 9060, 14700kHz (USB)
Identifiers: RM1 to RM14

Frequencies: 9050, 10444kHz (USB)
Identifiers: Delta1 to Delta9

Utility Monitoring Central

The turn of the new year and the indoor activities of the winter months reminds us to remind you about checking in to *Utility Monitoring Central*. UMC was established a few years ago as a free resource to aid digital utility enthusiasts, both new and experienced, in their listening. To this day the site still proves to be popular and continues to average well over 2,000 unique visitors each month.

Examples of what can you find at UMC include:

- in-depth profiles of diplomatic, military, commercial and NGO operations on HF
- a monthly logbook of choice intercepts from the receivers at Digital Towers
- daily updated databases of ALE identifiers and SITOR, PacTOR and Packet Radio selcals
- other databases – sorted by mode, for example – to allow easy access to stations for those with decoders of differing capabilities

Please feel free to check into UMC at **http://www.chace-ortiz.org/umc**. Until next month, enjoy your listening.

Resources

Egyptian MFA Profile
http://www.chace-ortiz.org/umc/mfatext/Egypt.txt
SeaWave
http://www.seawave.com
FCC General Menu Reports
http://svartifoss2.fcc.gov/reports/index.cfm

Global Forum

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Deutsche Welle Drops English to U.S.

Deutsche Welle will cease its Au/NZ/Pac and NAm English SW services on March 29th. The BOD has decided this to economize from the A-03 season on. SEAs/SAs/Af services will remain, not sure about EAs, reveals Wolfgang Bueschel, Germany, in *DX Listening Digest*. Ted Schuerzinger and Daniel Say on the *swprograms* list aren't surprised: Since they got rid of their mailbag program to North America a while back, that's one more reason not to write; death of *Letterbox* to NAm was a strong sign that they are dropping NAm, and probably Oz.

Kim Elliott reports: A well-placed source at Deutsche Welle tells me that "...with an ever shrinking annual budget, (DW management) have decided that by ending shortwave broadcasts to the USA and Canada, roughly 250,000 Euros can be saved annually. More emphasis is to be put on gaining more rebroadcasters. Experience tells me that this will be a futile exercise as far as the United States are concerned."

How does that jibe with this from the DW website, forwarded by Dan Atkinson? DW-Radio's English Service will experience the biggest facelift in its 40 year history with the start of summer time at the end of March 2003. We plan to increase substantially the number of news bulletins we broadcast every day from 13 to 24. News on the hour every hour is a must for any radio service that wants to be taken seriously internationally and in future DW-Radio News24/7 will be our visiting card.

We also plan to broadcast *Newslink*, our flagship current affairs program round the clock, producing special editions tailored to meet requirements of audiences in respective target regions. This means there will be three live editions of *Newslink* for the Asia-Pacific Region, two for Africa, with repeats, two for North America and two for Europe every weekday.

It's no coincidence that DW was to be added to the World Radio Network lineup on Jan 1, to NAm daily at 0600, 1100, 2100, 0030 and M-F 1500 per the *WRN Newsletter*) Kevin Kelly points out that these replace SRI. But Mike Cooper notes that change was delayed.

Bob Padula in *EDXP* says DW English on SW from March 31 will be: 0000-0100 India, 0400-0700 Af, 0600-1900 Eu on 6140, 1100-1200 As, 1600-1700 India/As, 1900-2200 Af, 2100-2200 Eu, 2200-2400 As. This major reduction in output represents several hundred frequency-hours per week.

Radio Netherlands Reorganizing

Radio Netherlands announced major revisions to its global mission in mid-January. RN will now focus production on selected global themes. Lodewijk Bouwens, Director General, says, "We now want to strengthen the number of active partners in selected parts of Africa and Asia. Daily production in three languages is essential for this task: the world languages of English and Spanish, plus Indonesian. ... More extensive co-productions will be needed with our domestic broadcast colleagues to maintain a radio, TV and Internet service for Dutch speakers living abroad. Radio Netherlands will eliminate any duplication of effort and consolidate some of its shortwave radio distribution within Europe, to Latin America and the Pacific (This is from an RN press release via *Media Network*, Sergei Sosedkin)

More specifically, from the website via Harry van Vugt: RN will continue to broadcast in Dutch, English, Spanish and Indonesian; other language areas will be served on a project basis. The changes, which will go into effect by October this year, will mean the loss of around 60 jobs. Andy Sennitt adds that they are mostly in the Dutch language service, to the dismay of the labor union.

It did not take long for the union to reject the plans. As reported on RN's own website **http://www.rnw.nl** via Mike Terry: The journalists' union NVJ and the CNV trade union confederation say the loss of 60 jobs is "unacceptable." They also reject the starting date of October 24. The plans for a radical reorganization have caused widespread unrest among employees and listeners. One of the main effects would be a dramatic reduction in the station's shortwave transmissions.

Jaime Baguena of the Spanish department tells us more: the Brazilian section would be abolished; Spanish SW broadcasts to Americas would be reduced to 1030-1130 and 2000-2200, hardly convenient hours. English hours would drop from 12 per day to 8, and Dutch from 18 to 8. It's feared that 100 or more of RN's 400 employees could be dismissed.

AFGHANISTAN [non] I call Merlin's dramatic fill music, often heard on 18940 relay, "Fanfare for the Common Afghan." Apologies to Aaron Copland! (John Cobb, GA)

ARGENTINA Another station heard via the 15820-LSB feeder is FM Vivir // 87.5 MHz, at 0955-1004, gospel music, complete ID; unauthorized station from Ministerio Caudal de Vida Church, Domingo Faustino Sarmiento 1840, San Miguel, Buenos Aires province. At 1005 switched to Radio Diez relay (Arnaldo Slaen, Argentine, *hard-core-dx*)

AUSTRALIA HCJB inaugurated new Kununurra station Jan 5, 0700-1200 to Pacific on 11755. Suffers heavy QRM from Finland and only about 30% intelligible here in target zone (Paul Ormandy, New Zealand, *DX Listening Digest*) Don't know why 11755 was retained for Kununurra, occupied for many years by Radio Finland, well heard throughout Australia via long-path. This is a further example of an inappropriate frequency selection, the planning process hopelessly flawed by inadequate analysis of channel occupancy in the primary service area (Bob Padula, Australia, *EDXP*)

Reports with IRC to HCJB-Australia, GPO Box 691-E, Melbourne, Australia, 3000 (Dennis Adams, *DX Partyline*) Per Ian Williams, Frequency Manager, HCJB Australia, the start of transmission to India would be delayed until Jan 19, on 15480, 100 kW, 307 degrees at 1230-1730 (Alokesh Gupta, New Delhi, India, *DX Listening Digest*) Delay caused by major windstorm, severe damage to antenna to Asia. E-mail for reports: english@hcjb.org.au (Dennis Adams, *DXPL*) New times for *DX Partyline*: Sat 0930 and 1430 (Allen Graham, HCJB, *EDXP*) South Pacific release adds programs to regionalize service; Au government asked us to include shows originating in Au. First half hour each weeknight (0700): Mon, *Music of Australia* including Au culture, history, folklore. Tue *Music of Asia*. Wed *Music of NZ*. Thu *Music of S Pacific*. Fri *Music of Asia*, another edition. 0800 each weeknight, *Great Destinations*, tourism in Pacific and Asia (Dennis Adams, Melbourne, *DXPL*) Initial broadcast ran only 13 kW (Ian Williams, Frequency Manager, HCJB Australia via Alokesh Gupta, India, *DX Listening Digest*) David C. Maindonald, Australian Director e-mailed me another p-mail address: HCJB Australia, P.O. Box 291, Kilsyth, Vic. 3137 (Wayne Bastow, ARDXC) Plans are to eventually expand to five transmitters and 16 broadcast towers as land and funds become available (HCJB website)

They call themselves "HCJB Australia, The Voice of the Great South Land." Totally unusable until 0900 due to Finland. Worked much better on same frequency from Ecuador, as on darkness rather than daylight path. "If it ain't broke, don't fix it"! Even if reception was good, I wonder who would listen to the station. One program I heard was attacking the theory of evolution and promoting creationism. (Barry Hartley, New Zealand, *BC-DX*)

BELARUS' After a year on reduced schedule from 1600, low power relays of Belarusian Radio resumed full schedule in Jan: BR1 at 0400-2300 on 6010, 6040, 6070, 6190, 7110, 7145, BR2 at 0500-2200 on 7265 (Bernd Trutenau, Lithuania, *DX Listening Digest*)

BELGIUM Eugene Gebruers, contributor of DX news and recordings to RVi *Radio World*, passed away in October. He was born in 1923. The Dec 29 show was a nice tribute to him (gh)

BOLIVIA R. San Miguel, Riberalta, after transmitter problems has stabilized on 4929.98, audio no longer distorted, religion until 0112* (Björn Malm, Quito, Ecuador, *SW Bulletin*)

BOTSWANA New Year's Eve party on 4820 was a close second to Solomons. At 2151 an open air concert of Afropops and the announcer walked through the crowd talking to several people in Setswana. Final ten seconds were counted down in English and the crowd went wild with joy. The concert soon continued (Mark Coady, ON, *DX Listening Digest*)

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; B-02=winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

BRAZIL From Jan, R. Gazeta, São Paulo, 5955, 9685 and 15325, rebroadcasts the Catholic programming of Rádio Canção Nova, Cachoeira Paulista, which is on 4825, 6105 and 9675 (Célio Romais, @tividade DX) Instead of de-religifying itself as previously reported (gh) However, Gazeta does carry student programming only half an hour a day at 0930, Gazeta AM Universitária, produced by students of the Faculdade Cásper Líbero (Paulo Roberto e Souza, @tividade DX)

R. Globo, São Paulo has returned to SW on 9585, which until it disappeared recently, was occupied by CBN (Rudolf W. Grimm, São Bernardo, SP, radioescutas) R. Globo, SP, on 9585 heard simulcasting R. Globo, Rio which is on 6030 and 11805, now called Globo Brasil, an economizing measure to reduce staff. But would the Cariocas and Paulistas put up with hearing futebol coverage from the other city? (Rudolf Grimm, *@tividade DX*)

Rádio Nacional da Amazônia using 9665 at 0830 // 11780 with usual phone-in program and, at 0900, *Jornal Nacional*. 9665 seems to replace 6180. No trace of signals from Marumby 9665 (Noel R. Green, England, *Cumbre DX*) On Sunday mornings, RN Amazônia stays on the air between 0500 and 0700 with Forromania, with typical Northeastern music presented by Eneias Oliveira, who can keep talking for several minutes almost without taking a breath (Célio Romais, *@tividade DX*) Huge signal on new 9665, around 0700 UT Sun with that mile-a-minute announcer. Anyone in the way on 9665 would be well advised to evacuate, as Habana already has. Wonder if ramping up government SW broadcasting is on Lula's agenda. Fidel could use some borrowed transmitters (Glenn Hauser, OK, *DX Listening Digest*)

CAMBODIA V. of Cambodia active again in Dec on 11940.3, English 1159, opening music, ID, Asian music. Strong signal but bad audio, 8/12 (Takeno, Japan, *ADXN*) 1200 muffled music, 1213 opening French (Craig Seager, Australia, *ibid.*)

CANADA CFVP, Calgary, 6030, at 0930 after Sudwestrundfunk started to fade, before R. Martí and the Cuban jammer obliterated frequency, very nice reception of 100 watt SW relay of CKMX. Excellent modulation, respectable S7 signal peak. By 0954, a 20 over 9 unmodulated carrier, presumably Martí (David Hodgson, TN, DX Listening Digest)

CHINA R. Fujian is reactive: 4975 2256-2321, 0955-1032; 5040 2245-2324, 0945-1035. Transmitter is turned on/off abruptly without announcement; duration also varies (Miller Liu, Taiwan, *DX Listening Digest*)

COLOMBIA Ondas del Orteguaza, Florencia, 3479.99 harmonic at 1037, great signal intended for farmers up early: *Amanecer campesino*. Earlier heard 2nd harmonic 2319.72; this is 3 x 1159.96. Also, 3rd harmonic of 1530 on 4530.00 at 0000-0100*, La Voz del... and callsign HKJ93, which is listed for 103.2 FM at Parroquia Nuestra Señora Mercedes, de la Mutiscua (Björn Malm, Ecuador, *SW Bulletin*) That's in Norte de Santander, next Venezuela (Henrik Klemetz, Sweden, *DX Listening Digest*)

Communications chief for FARC, Yira Paola Bolaños, alias 'Laura' was arrested in a Cali apartment Jan. 13, a major collar in the Western Block. She is accused of being responsible for the illegal clandestine La Voz de la Resistencia. Authorities are still trying to locate the station's transmitter up in the mountains (El País, Cali, via Richard Stoller, *DXLD*)

CROATIA [non] HRT replaced 9925 with 7285 Dec 22, 0200-0600 to NAm, still on 9925 0000-0200 for SAm (Mark Taylor, WI, *DX Listening Digest*) Relay by DTK Germany. The Europeans just won't stop invading NAm hamband. You'd think DTK would know better, if not HRT. *Intruder Watch Alert!!* (gh)

CUBA R. Reloj under BBC 6195 until that closed at 0759:30 and then in the clear. Good signal for a few minutes to half an hour before it closes; detailed weather at 0811 (Noel R. Green, England, *Cumbredx*)

DJIBOUTI According to DeepikaGlobal.com, Djibouti has been promised by the US government $2 million to renovate state-run Radio Djibouti, along with $100,000 in annual rent, in exchange for a strategic MW station the United States is building for VOA just outside the capital (Ulis Fleming, *Cumbre DX*) Last June, BBG asked for bids for both MW and a 50 kW SW here for RTV Djibouti (Hans Johnson, *ibid.*) Used to be 4780

ECUADOR 2240.00H, Radio Positiva, Quito, heard until 0003* on 2240.00, // 860 of which this is not a harmonic. *"Radio Positiva 860 kHz en amplitud modulada, una voz ecuatoriana para el mundo"*, NA. Sometimes closes later.

La Voz de Santo Domingo, (de los Colorados), 2nd harmonic on 2700.78 until 0215* (Björn Malm, Quito, Ecuador, *SW Bulletin*)

ERITREA [non] V. of Eritrean People, new clandestine, was never heard in December on the announced schedule; has anybody found it? (Chris Greenway, Kenya, *DXLD*) On 9990 via Kvitsøy, Norway, at 1630-1657 Sundays only (Wolfgang Bueschel, Stuttgart, Germany, *DX Listening Digest*) Thanks to Wolfgang, who tracked down the relevant Merlin registration for a Norwegian transmitter, confirmed on 9990, heard here in Nairobi in progress at 1640 on Sunday 12 January with music, poem, anti-Eritrean government commentary in Tigrinya. Good signal. Suddenly cut at 1657 before commentary ended and so no closing ID. One remaining mystery remains their broadcast to Europe, said to be 1700 Sundays on 7530 (Chris Greenway, Kenya, *DX Listening Digest*) Sunday only broadcast at 1630-1657 on 9990, and 1700-1727 on 7530 both received perfectly here (Ivo and Angel! *Observer*, Bulgaria)

ETHIOPIA R. Fana on 6210 and 6940 from about 1755 to 1830. I e-mailed reception report to rfana@mail.telecom.net.et and received verification from Haile Tiku saying they are 10 kW each and heartened to be heard as far as NZ (Ian Cattermole, *Cumbre DX*) 6209.92, 0356-0430, // 6940 but far better on lower frequency, slightly unstable, drifting back and forth (Bob Montgomery, PA, *ibid.*)

GERMANY Contrary to previous plans, Bayerischer Rundfunk did not close down 6085 Dec. 31; instead changed to B5 Aktuell all-news service *0500-2300* but off the air overnight (Anker Petersen, Denmark, *DX Listening Digest*)

GUAM KTWR back on the air during the JSWC specials Dec 28 & 29, 9465 at 1200-1230, 11690 at 2100-2130 (Anker Petersen, DSWCI *DX Window*)

After 22 days without electricity, KSDA resumed schedule on Jan 3. All four of the tall curtain antennas sustained serious damage, emergency generator failed and was declared irreparable. Some languages went out via Taiwan, UAE in the interim (Adrian M. Peterson, AWR)

HONDURAS R. Litoral at 0300 one night on 4830.1; a week earlier on 4832, and in between, R. Táchira, VENEZUELA [q.v.] was on 4830. The two were never on at the same time (John Sgrulletta, Mahopac, NY, *Cumbredx*)

ICELAND Rikisútvarpið, scheduled 1200-1300 on 13865, but in reality 13865 does not suddenly switch on until 1211 (Sergei Alekseichik, Hrodna, Belarus', *Signal*) Noon broadcast was always 1215-1300, live relay of the RÚV main noon newscast which actually starts at 1220. "Odd" start time has a long tradition back to when people went home for lunch, and RÚV was waiting 20 minutes with the news so everybody would have time to reach home, sit at the table and switch on the radio (Bernd Trutenau, Lithuania, *Cumbre DX*) How quaint

INDIA Special Haj broadcasts in Urdu from AIR Jan 14-Mar 14, for thousands of Muslim pilgrims to Mecca, 0530-0600 on 13620 Bangalore and 15770 Aligarh (Jose Jacob, VU2JOS/AT0J, *dx_india*)

IRAN VIRI frequency changes include English at 0030-0227 on 6120, ex-6135 (Ivo and Angel! *Observer*, Bulgaria)

[non] V. of Southern Azerbaijan was to start in early Jan (*Baku Today* via Jilly Dybka, NASWA *Flashsheet*) Wed and Thu only at 1630-? on 9570, from Jan 8 but no sign of it here, nor on Jan 9 (gh) Only Romania and V. of Iraqi People (Mauno Ritola, Finland, *Cumbre DX*) Nor in Germany (Mahmud Fathi, *Cumbre DX*) A Qur'an station was there already from 1500, and then Romania from 1600. Nothing happened at 1630. Qur'an station was slightly low frequency, so a low het with RRI (Olle Alm, Sweden, *WORLD OF RADIO*) Israeli squabble with Iran? Former clandestine Southern Azerbaijan Radio, heard in the Nineties did originate from Yavne transmitter site in Israel (Wolfgang Bueschel, Germany, *BC-DX*) Ahá — its no-show could be explained by the unexpected storm damage to Yavne antennas, also messing up Israel's own transmissions (Glenn Hauser, *DX Listening Digest*)

IRAQ [non] Commando Solo, airborne Information Radio from US forces, resumed operations December 12, this time over Kuwait, for Iraq. Previous mission had been for Afghanistan until last March. Schedule 1500-2000 on 9715 and 11292. Despite co-channel interference from DW and Russia, DXers in Europe had better reception on 9715. Programming included music in Arabic and English, and material critical of Saddam. More info, transcripts and illustrations of leaflets dropped are at the Central Command **http://www.centcom.mil/Default.htm** (via Artie Bigley, Alan Pennington)

Something wrong with 11292 modulation. Strong carrier at 1525 but only occasional snatches of very faint modulation, Arabic music (Andy Sennitt, Holland, *Clandestine Radio Watch*) ID reported as *''Idha'at Radiyo al-Ma'ulumat''*, but that means ''Radio Radio Information'' (Liangas & Zeidan, DSWCI *DX Window*) Strange but true, yet that is how the ID goes! - listen to the clip on the Interval Signals Archive at **http://www.intervalsignals.net/countries/clandestine-active.htm** (Dave Kernick, UK, *DX Listening Digest*) My Arabic speaking neighbour suggests the ID means "base of Information" (Johno Wright, ARDXC) Interview with BBC Monitoring about it and some samples: **http://www.npr.org/ramfiles/wesat/20021221.wesat.04.ram** (gh)

IRELAND Founder and owner of Radio Dublin, the longest-running pirate radio station in Ireland [ex-6900], Eamonn "Captain" Cooke (66), has been found guilty in the Central Criminal Court of sexually assaulting four girls in his home (*Ireland Online* via Ulis FLeming)

KOREA SOUTH RKI heard at 1800 on 8300, mixture of French and something else. That's the difference between 15575 and 7275; there could be another mirror on 22850 (Vlad Titarev, Ukraine, *BC-DX*) 8300 being where you might expect to hear Star Star, the Taiwan numbers station, earlier around 1400 (gh)

LAOS/THAILAND/VIETNAM Are unable to coordinate use of 7145! All three at 1300: Laos and Vietnam in French, Thailand in Malay; Vietnam dominating here (Roland Schulze, Philippines, DSWCI *DX Window*)

LESOTHO On 4800, an African station heard Jan 3 at 1850 with phone-ins, blocked by China after 2000 (Alf Aardal, Norway and Jari Savolainen, Finland, *dxing.info*) It's R. Lesotho reactivated after a few months, heard from 0246 with local music, 0300 ID in Sesotho (Caio Fernandes Lopes and Samuel Cássio Martins, DX Clube do Brasil) LNBS resumed, good in Melbourne around 1800-2000* in local languages. Close-down time varies; when later than 2000, strong interference from China NR-1, *1958 (Bob Padula, *EDXP*) Presumed this with nonstop African music as late as 2240 (Mick Delmage, Alberta) Tho scheduled until 2200 (*WRTH* 2003)

MALDIVE ISLANDS Voice of Maldives new webcast is at http://www.vom.gov.mv/ (Pentti Lintujärvi, Finland, *DX Listening Digest*) Including English 1200-1400, news at 1300; sometimes on 5998.5, and future plan for regular SW service maybe on 11 MHz band (*WRTH* 2003)

MYANMAR R. Myanmar again heard on 4725 which was left last summer for 5040.6, but 5040.6 is also still on in // at 1243. Not sure if this is a new or fixed transmitter or a readjusted frequency on 4725. Hummy transmitter still on 5040.6, cleaner audio on 4725. Not sure if the 'new' 4725 is ex-5985.8 (Hans Johnson, TX, *Cumbredx*) Agree with Hans that transmitter previously used for 4725 now carries program on 5040. The hum on that latter can hardly be missed. 5985 is still there carrying the regular Myanmar program (not parallel 4725 and 5040) (Richard Lam, Singapore, *Cumbre DX*) Possibly same transmitter used for 4725 and 5985 now. It's possible that 5040.6 comes from the transmitter that is usually 600 Hz or so above channel on 9730 – formerly it was also on 5985.6v throughout the evening (Alan Davies, Indonesia, *ibid.*) 4725 went off abruptly at 1230 but same program continued on 5040.6. 5985.0 was heard with main service before 1230 with English lesson, so three SW frequencies carrying Myanmar Radio were on simultaneously. And 6570 Defence Forces heard as usual from 1330 (Alan Davies, Sengigi, Indonesia, *Cumbre DX*)

NIGERIA [non] Jakada Radio International commenced regular broadcasts in Hausa 23 December, M-F 1900-1930 on 12125 and **http://www.jakadaradio.com** Test transmissions first heard in May 2002, but had been on "temporary break." HFCC says site is Armavir, Russia. JRI describes itself as a non-religious, non-political, commercial radio station, committed to fundamental human rights, democracy, rule of law and pluralism. Chairman, Yaro Yusufu Mamman, is a former Nigerian ambassador to Spain and former chairman of the Nigerian political party Alliance for Democracy. He also worked as a journalist with the Broadcasting Company of Northern Nigeria and the Nigerian Television Authority (© Radio Netherlands *Media Network*)

NORWAY BBCWS on R. Norway frequencies, 1700-1730 on 18950, 1800-1830 on 15705 and 13800, 1900-1930 on 13800, relays of Europe stream 9410 and 6195 and followed by Radio Denmark on the half hours (Bernie O'Shea, Ottawa, Canada, *DX Listening Digest*) BBC also at 0500-0530 on 7465 and 7490 (Alexander Yegorov, Ukraine, *Active_DX*, via Sergei Sosedkin) Also at 1205-1230, 1305-1330 on 12070, 15735 (Edwin Southwell, UK, World DX Club *Contact*) R. Norway is dead and gone. Instead NRK puts the all-news network on SW, and Alltid Nyheter in turn relays BBC WS. So this is simply NRK output (Kai Ludwig, Germany, *DX Listening Digest*) Even tho in English. See also UK

Due to lack of electricity(!), Kvitsøy and Sveio will be on half power, approx. 200 kW, from January 15 to March 15 (Erik Koie, Copenhagen, Denmark, *DX Listening Digest*)

PAKISTAN R. Pakistan at 1515 on new 5079.8 (Karel Honzik, Czechia, *hard-core-dx*) Would be their *Current Affairs* program at 1300-1800 (Noel Green, England, *ibid.*) 5080 was recommended to the PBC to replace 7105, due to severe QRM, *Current Affairs* service at 1300-1800. Transmitter API-4 Islamabad 100 kW (Green, *Cumbre DX*) Morning remains on 7105 (more like 7106). This transmitter often has problem with frequency exciter producing loud howl, audio barely audible, several subcarriers interfering with each other, both frequencies equally affected (Olle Alm, Sweden) Varied up to 5083, at 1551-1604 in Urdu (Kouji Hashimoto, *Japan Premium*)

PERU Ing. Alfonso Cáceres, Gerente de Operaciones, R. Tacna says 9505 runs 200 watts at *1000-2400* and he enjoys reception reports (Nicolás Eramo, *Conexión Digital*) 9504.9 logged on 5 dates in December as early as 1004, other days signing on at 1020 or 1030 (John Sgrulletta, NY, *Cumbre DX*)

Huancabamba station heard on 6536.0 at 0200-0232*, lots of fading, traditional music and political commentary but never an ID (Adán González, Venezuela, *DX Listening Digest*) It is Rdif. Huancabamba, 2348-0102* back on air after several weeks. Owner Federico Ibáñez said equipment had been sabotaged by political rivals in the November provincial elections (Rafael Rodríguez, Colombia, *Conexión Digital*) Finally IDed a few nights later as this until 0100* (Adán González)

R. Victoria, Lima, at 2340 on 18060.66, harmonic 3 x 6020.22 (Björn Malm, Ecuador, *SW Bulletin*)

RUSSIA/CIS Advance 60 metre band frequency registrations for the A03 period show a continuing decline in operational requirements:

4010 Kyrgyzstan, 2300-1800, DS
4635 Tajikistan, 1400-1100, DS
4795 Russia, Irkutsk, 2100-1700, DS
4810 Armenia, 0200-1415, DS and FS
4810 Armenia, 600-2015, DS and FS
4825 Russia, Yakutsk, 1900-1500, DS
4930 Turkmenistan, 0100-2100, DS
4940 Tajikstan, 1200-1600, Voice of Russia
4965 Tajikstan, 1200-1400, 1500-1600, Voice of Russia
4975 Tajikistan, 1200-1600, Voice of Russia
5015 Turkmenistan, 2100-1900, DS
5025 Uzbekistan, 0230-0330, 1545-1630, 1730-1830, 1930-2200, DS and FS
5035 Uzbekistan, 1930-2030, Voice of Russia
5040 Uzbekistan, 1330-1500 DS
5060 Uzbekistan, 1330-1500
(Bob Padula, *EDXP*)

SA'UDI ARABIA [non] Within a few days of its start, V. of Reform was jammed on 7590 from before 1900 until after 2102 (Anker Petersen, Denmark, DSWCI *DX Window*) Announced that to overcome jamming, would move Dec 22 to 9930 and expand to *1830-2130* (Mahmud Fathi, Germany, *Cumbre DX*) 9929.96 much stronger than 7590, tho still with audio breaks, and bubble jammer followed (Paul Ormandy, New Zealand) The day before started and ended on 9930, but in between, 1858-2058 on 7590 (Anker Petersen, Denmark, *hard-core-dx*) This opposition group has a room on http://www.paltalk.com – listeners mainly giving points of view against the Sa'udi Government (Tarek Zeidan, Egypt, *BC-DX*) Shifted again to 9925 at 1830-02130, from Norway, totally blocked by Belgium until 1857 (Ivo and Angel! *Observer*, Bulgaria)

SEYCHELLES FEBA will be phasing out and closing its SW station in Seychelles by the end of the year. This was announced by International Director John Bartlett in late December 2002. Some programs are already going out via other transmitter sites such as UAE and this will be expanded. FEBA began 30 years ago and now has three 100 kW SW transmitters, reports Dr Hansjoerg Biener.

Previous reports mentioned increasing problem of housing development near FEBA coastal site, really why they give up? A Communiqué from FEBA, quoted in Seychelles *Nation* via Artie Bigley says: "Growing difficulty in maintaining a station, which uses 30-year-old technology, and increased competition from less expensive broadcasting outlets coupled with the difficulty of broadcasting to India because of difficulties with sunspots in 2003/4/5, indicate that the timing is set for change."

SIERRA LEONE Presumed R. UNAMSIL on 6139.1 at 0301-0315, rap, reggae, hi-life, better signal than before if you can get away from strong 6145 QRM. This is not a problem for the R8B in LSB sync mode (George Maroti, NY, *Cumbredx*) How is it pronounced, Jim? (gh) You-namm-sill, but said quickly (Jim Renfrew, NY, *DX Listening Digest*)

SOLOMON ISLANDS SIBC 5020 had the best New Year's Eve party by far. They were rocking from 1121 tune in with great music, phone calls from listeners, and a constant countdown. At 1300 the countdown was followed with shouts of "Happy New Year" and drawn out chants of "It's 2003". *Auld Lang Syne* was played followed by Abba's *Happy New Year*. At 1306, Governor General gave his 20 minute New Year's Address that was preceded and followed by *God Save the Queen* and the national anthem. At 1326 it was back to the party (Mark Coady, ON, *DX Listening Digest*)

SOMALIA QSL letter for R. Hargeisa, 7530 in 3 weeks. Letter, including $1 sent to: Konsularishe Vertretung Somaliland, DJ6SI, Baldur Drobnica, Zedernweg 6, D-50127 Bergheim, Germany. Reply mailed from Czech Republic (Claes Olsson, Sweden, *Cumbre DX*)

TATARSTAN QSL and personal letter from Voice of Tartarstan QSL manager Ildus Ibatullin, informs that as of January 1, 2003 the "Voice of Tartarstan" would be called "New Century". ID in Russian, "Nowyy Wek" and Tatar, "Yanay Gasyr". Frequencies same (Scott R Barbour Jr, NH, *DX Listening Digest*)

TUNISIA Contrary to last month's remark, 7190 does appear in HFCC and other schedules for RTT, B-02 in Arabic:

0200-0400 9720 12005
0400-0500 7190 7275 9720 12005
0500-0700 7190 7275
1200-1400 15450 17735
1400-1700 11730 11950 15450 17735
1700-1900 7225 9720 11950 12005
1900-2100 7190 7225 9720 12005
2100-2300 7190 7225 (via Ivo and Angel! *Observer*, Bulgaria)

UKRAINE Against my monitoring advice, because of jamming around 7365, RUI changed from 9810 to 7375 in January (Kraig Krist, *DX Listening Digest*) From 1 January RUI changed its two frequencies: 6020 to 7420 (290 degrees), and 9810 to 7375 (314) (Alexander Yegorov, Kiev, *BC-DX*)

A lonely on SW Ukrainian commercial radio company "Alex" in Zaporizhzhia has launched into the air its transmitter on 11980v. Heard at 1012 with bad modulation, weak 250-W signal, relaying UR-1 National Radio, blocked after 1200 by CRI (Alexander Yegorov, Kiev, *BC-DX*) Using the name Dniprovska Hvylya (in Ukrainian) and Dneprovskaya Volna (in Russian). Yegorov says this "Dnieper's Wave" is on Sat and Sun 1000-1300, power only 100 watt, reduced carrier, N-S dipole. Address: Alex TV & Radio Broadcasting Company; 48, 8th Bereznya St, Zaporizhzhya, 330068, Ukraine (*DXing.info*)

UNITED KINGDOM [non] Laser Radio via Latvia 5935 changed time Jan 12 to Sundays 1600-2100, with *Media Show* in final hour (via Sergei Sosedkin, *DXLD*) Strong co-channel Voice of Russia 1500-1700 in Persian and 1700-2000 in Arabic (Ivo and Angel! *Observer*, Bulgaria) Latvia stuck on 5935 for sesquidecades

Norway's relays of BBCWS on SW [q.v.] also mean higher quality webcasts than from BBC itself. Besides various half hours in the afternoons, BBCWS European stream is continuous overnight (and no Denmark on the half hour here!): Mon-Thu 2100-0500 UT; Fri 2003-0800; Sat 1847-0800; Sun 1847-0500. The best stream is 128K MP3, **http://media.hiof.no/streams/m3u/nrk-alltid-nyheter-128.m3u** (Kevin Kelly, PublicRadioFan.com)

U S A WRMI added *Solid Rock Radio*, UT Sun 0500-1000 7385, 1500-2100 15725. Originates on 104.9 in Buffalo NY (WRMI) Another addition to WRMI is *Stocktalk Live*, M-F 1430-1530 on 15725, rather informal monolog about micro-cap stox that seem to be on the way up (gh)

Equal opportunity hate: George Gentry Ministries is so obscure that a Google search turns up nothing but the program schedule on the WWCR website. Heard Sunday at 1130 on 5070 [*Exposing the Unexposed*]. Never heard a mailing address. Mr. Gentry seems to believe that white people are the source of all the world's problems, a mishmash of theology pushed, prodded and pulled into a grotesque shape designed to fit the presenter's viewpoint (Fred Waterer, Ont., *Programming Matters*, ODXA *Listening In*)

WWRB began low-power testing of its fourth transmitter Dec 21, capable of 150 kW AM. Expected to greatly expand capabilities when in regular service within a few months; low 3 MHz is an excellent candidate for nighttime. FCC and FAA have licensed WWRB as an aeronautical enroute communications facility, transmitter site Manchester TN, receive site McCaysville GA. Will be called "Nashville Radio" (Dave Frantz, *DX Listening Digest*)

FCC actions Dec 24 including modifying WBCQ license to add another transmitter and antenna (via Benn Kobb)

VOA Cantonese rescheduled to 1300-1500 on 9705, 11865, 15160 with the final sesquihour also on MW 1143 (Dan Ferguson, IBB, *DX Listening Digest*) Coinciding with new all-news format from Jan 6 (VOA press release)

VENEZUELA R. Táchira still active, but irregular on 4830 (Rafael Rodríguez, Colombia, DSWCI *DX Window*) Such as at 1042 with song about Táchira (Chuck Bolland, Clewiston, Florida, *DX Listening Digest*) Excellent at 0059 with nice music program. ID at 0110 as *"Radio Táchira, La Voz de Táchira en Venezuela"*. Full ID at sign off 0130 included frequency and meter band. Short song after ID to close, but not NA. Instead some song about Táchira or Radio Táchira (John Sgrulletta, Mahopac, NY, *Cumbredx*) State songs are big in Venezuela

Some webcasting stations including Mara 900 are at **http://www.radiovenezuela.com.ve** (Henrik Klemetz, Sweden, *dxing.info*) More radio online from Venezuela: **http://www.unionradio.com.ve/audio/** (Horacio Nigro, Uruguay, *Conexión Digital*)

VENEZUELA R. Nacional de Venezuela, inactive on 9540, has been promoting itself as a SW station, and running its SW programs nightly at 0500 on MW 1050, in which 9540 is mentioned for broadcasts at 1100, 1400, 1800, 2100, 0000 and 0300. Reports may be sent to Apartado Postal 3979, Caracas 1010 or a new E-mail address of *ondacortavenezuela@hotmail.com* (José Elías Díaz Gómez, *Cumbre DX*) Reply came from C. Ali Méndez Martínez, SW chief, that RNV would soon be on SW (Gabriel Iván Barrera, *Conexión Digital*)

Relayed by Cuba Sunday mornings on 15570 from 1410 waiting for *Aló, Presidente* to start. Sounds more like a clandestine than an official government station (Rafael Rodríguez, Colombia, *Conexión Digital*) Rafael says listeners were warned from tuning in to "fascist and terrorist communications media" and against the anti-governmental *"Coordinadora democrática"* (Henrik Klemetz, Sweden, *DX Listening Digest*)

ZANZIBAR R. Tanzania Zanzibar was in the clear and widely reported in NAm during A-02 at 1900-2100* on 11734.1v; the situation could change in A-03, so try to hear it before the end of March (gh)

Until the Next, Best of DX and 73 de Glenn!

Gayle Van Horn
gaylevanhorn@monitoringtimes.com

0014 UTC on 4959.85
DOMINICAN REPUBLIC: Radio Cima. Spanish service with tunes and commercial ads including *Banco Popular* to "Cima " ID. (Harold Frodge, Midland, MI) **Radio Pueblo Santo Domingo** 5009, 1058 with IDs and *Deportiva* by Fernandito. (Fernando Garcia, Baltimore, MD)

0030 UTC on 9645
BRAZIL: Radio Bandeirantes. Portuguese sambas de escuelas and their origins. Signal lost by 0057 from Deutsche Welle's interval signal. Brazilian's audible; **Radio Pioneira** 5015, 0230 with religious crusades service; **Radio Marumby** 9665, 2305; **Radio Senando** 5990, 0930; **Radio Difusora do Amazonas** 4805, 0945. (Garcia, MD) **Radio Educacao Rural** (tent.) 4755, 0044-0104+; **Radio Cancao Nova** 4825, 0222-0238+; **Radio Brasil Central** 4985, 0147-0159+. (Frodge, MI)

0055 UTC on 11800
ITALY: RAI. News item covering the Franco Italian Summit. (Bob Fraser, Cohasset, MA; // 9675 (Duane Hadley, Bristol, TN; Stewart MacKenzie, Huntington Beach, CA)

0100 UTC on 9810
UKRAINE: Radio Ukraine Intl. English service of news and current affairs program. SIO 555. (Ricky Hein, Redfield, SC; Tom Banks, Dallas, TX)

0219 UTC on 9820
CUBA: Radio Havana. Feature on Latin artists to 0224, followed by *Economic Report on Cuba*. Audible 11670, 2044-2055+, SIO 333 USB; (Frodge, MI; MacKenzie, CA) 15120, 2215-2230 Spanish service including IDs. (Joe Wood, Gray, TN) 6195, 2300 weak signal for speech. (Fraser, MA) Cuba's **Radio Rebelde**, Spanish on 6140, 1224. (Frodge, MI)

0222 UTC on 6005
GERMANY: Deuschelandradio. DJ's German commentary between cabaret, folk and ballad tunes. Obliterated by BBC *2356. (Wood, TN) **Deutsche Welle** 3995, 0610 in German with IDs and address. (Frodge, MI; MacKenzie, CA)

0250 UTC on 4820
BOTSWANA: Radio Botswana. Familiar barnyard interval signal to 0259 choral national anthem. Opening identification and announcements in Setswana, followed by music and talk features, monitored to 0315; 2139-2200*. (Rich D'Angelo, PA/Cumbre DX) **VOA Botswana** relay 7415, 2043-2059+; SIO 253 until WBCQ *2056. (Frodge, MI) 7255, 0402 on national education. (MacKenzie, CA)

0402 UTC on 4976
UGANDA: Radio Uganda. English service newscast to 0410, followed by exhortations with many mentions of Kampala. SIO 332. (Frodge, MI) 4976, 2055 vernacular/English segments and ID to 2059*. (Gayle Van Horn, NC)

0424 UTC on 9590
NETHERLANDS ANTILLES: Radio Netherlands Bonaire relay. Dutch service to closure at 0425. French vocals following a six minute pause, noted as satellite feed delay from announcer. English service commencing with *Listener Feedback*. (Robert Pizzi, Goleta, CA) 17605, 2015 // 9895, 13700 newscast on *Free Trade Agreement*. (Fraser, MA, MacKenzie, CA)

0900 UTC on 9737.35
PARAGUAY: Radio Nacional del Paraguay. National anthem to catholic service and meditation. Programming portion of special transmission from Caacupe city all day. Station ID and address quote heard. Audible 9737.35, 2303-2340 with SINPO 34443. (Arnaldo Slaen, Buenos Aires, ARG)

1003 UTC on 4775
PERU: Radio Tarma. Sign-on to national anthem and hymn. Spanish morning greetings, Peruvian huaynos music dedications. Peruvians- **Radio Atlantida** 4790, 1030; **Radio Francisco Solano** 4750, 1040 ID, regional time check and off the air while playing Peruvian guajiras. **Radio Imperio** 4788v, 1100 with religious sermon. Station ID, "Radio Imperio...la onda Imperial." (Garcia, MD)

1041 UTC on 3279.6
ECUADOR: Voz del Napo. Spanish. Very nice music at tune in with S5 signal quality. Male announcer's brief comments to ID and music format. (Bob Montgomery, Levittown, PA/Cumbre DX)

1120 UTC on 4052.47
GUATEMALA: Radio Verdad. Spanish religious scripture readings to station address. Canned ID including frequency quote and local mentions. Nearly 100% signal copy, best signal observed in a awhile. (Dave Valko, PA/CDX) **Radio Buenas Nuevas** 4800, 1130; **Radio Cultural** 4780, 1000. (Frodge, MI; Slaen, ARG) **Radio Coatan** 4779.98, 0205-0215. (Hadley, TN)

1140 UTC on 9580
AUSTRALIA: Radio Australia. *Fine Music Australia*, // 11650. (Fraser, MA) 9815, 1813-1820+, SIO 2+43. (Frodge, MI; Banks, TX)

1500 UTC on 11690
JORDAN: Radio Jordan. Music countdown format including oldies, pop and rock. Echo-effect ID to pop Arabic music. ((Pizzi, CA) 11690, 1658-1710+(Frodge, MI)

1634 UTC on 21660
CYPRUS: BBC relay. Manchester United vs. Chelsea soccer. Fair quality // 21470, 17830. (Wood, TN)

1650 UTC on 17535
ISRAEL: Kol Israel. Possibly a programming relay from medium wave service to English newscast and sporting event. (Wood, TN) 11605 // 13720 at 2000. (Fraser, MA; Garcia, MD; Banks, TX)

1650 UTC 17850
FRANCE: Radio France Intl. English service with IDs and email address to pop music program, // 11615 (good) 15605 (poor). (Fraser, MA) **Radio Jamahiriya**-France relay 15660, 1710-1720 with *Call to Prayers*, fair quality. (Wood, TN; Hadley, TN)

1936 UTC on 7530.03 USB
SOMALIA: Radio Hargeysa (tentative). Noting very weak heterodyne, but clear and lively regional instrumentals at 1937.Flutes melody at 1958, followed by male announcer's comments and final song to 1958*. (Valko, PA/CDX)

2017 UTC on 7135
HUNGARY: Radio Budapest. Station ID and feature program, *Inside Central Europe*. 9835, 0217, with program repeat. SIO 354. (Frodge, MI; MacKenzie, CA)

2055 UTC on 9960
ARMENIA: Voice of. Excessive signal noise observed during remaining five minutes of programming. Postal and email addresses announced with closing, "you've been listening to the Voice of Armenia," as well as "Armenia Public Radio." (Gray, TN) 4810, 2049 // 9660, 2046-2059* (Montgomery, PA; D'Angelo, PA/CDX)

2100 UTC on 11855
ASCENSION ISLANDS: NHK/Radio Japan relay. ID to news headlines and Africa's *Weekly Countdown*. (Garcia, MD) // 11830 / / 17825 via Japan and barely audible. (Frodge, MI)

2135 UTC on 11740
IRAN: VOIRI. Station ID and *Call to Prayers*. National and Middle Eastern news headlines, covered at 2156 by WYFR. (Van Horn, NC)

2300 UTC on 9655
TURKEY: Voice of. Interval signal to ID. Newscast to travelogue on landmarks and history. (Garcia, MD) 6020, 2321-2130+ Turkish news to ID. (Frodge, MI)

2302 UTC on 9510
ROMANIA: Radio Romania Intl. News on Hungary and EEOC. Mentions of Serbia elections and US forces vs Iraq. (Wood, TN)

2305 UTC on 9505
PHILLIPPINES: Radio Veritas Asia. Latin dance music from announcer's Indonesian narration. Station ID at 2311 battling high static level // on 11820. RVA audible 11725, 2331 in Chinese and 12010, *1101-1107 Spanish/English. (Pete Costello, NJ/CDX)

2319 UTC on 7135
MOROCCO: RTV Marocaine. SINPO 44333 during news mentions of Washington DC, Yasser Arafat and national items. Station ID pauses amid regional music 2324-0000. (Wood, TN)

Thanks to our contributors – Have you sent in YOUR logs? Send to Gayle Van Horn, c/o Monitoring Times (or e-mail gayle@webworkz.com) ***Please note:*** *paper strips and cassette recordings will no longer be accepted. English broadcast unless otherwise noted.*

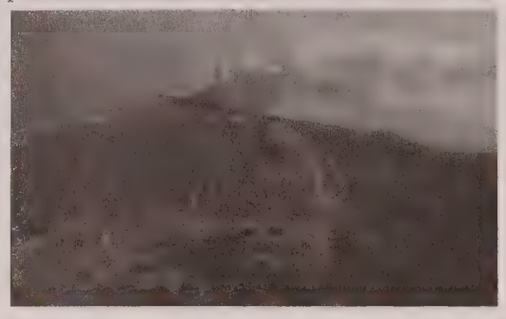
The QSL Report

Gayle Van Horn
gaylevanhorn@monitoringtimes.com

It's All About Storage

Every so often, a series of QSL cards are issued that quickly catch on with collectors. Such is the case for Italy's RAI International, currently issuing a series of four QSL cards depicting Italy's volcanos. The series includes Vesuvio, Stromboli, Vulcano and the ever-volatile Mt. Etna in Sicily. These should make a great addition to anyone's collection. Send your report to: P.O. Box 320, Correspondence Sector, 00100 Rome, Italy.

Part of the QSL game involves storage. By the time you've been active for a year or two, you will have at least one verie that is irreplaceable. The station may have left the air – an unfortunate trend which is increasing. If maintaining your verifications in a 3-ring binder does not appeal to you, consider some of these alternatives:



A small inexpensive safe might be adequate, or you may opt for your bank's safety deposit box. Protecting a larger collection requires additional storage considerations, and should be done so using archival safe supplies. Manuscript boxes provide protection, as do heavy duty poly cartons that are water and tear-resistant.

Stackable steel cabinets are perfect for long-term archival storage. As your collection grows, drawer units may be added. This latter method appears to be popular, as card and station memorabilia remain dust free.

Consider your options and plans for long-term storage by referring to *Light Impressions*, the leading resource for archival supplies at **http://www.lightimpressionsdirect.com**, or request a catalog at 1-800-828-6216. You will find an extensive variety available to protect your veries for decades.

AMATEUR RADIO

Antartica-KC4AAA, 20 meters SSB. Full data color card. Received in 24 days for a SASE to: Larry F. Skilton-K1IED, QSL Manager; 72 Brook St., South Windsor, CT 06074. (John Frombach KF3BN, Berlin, MD)

China-BD4XA, 15 meters SSB. Full data color card. Received in 34 days for one US dollar. QSL address: Kevin Yang, P.O. Box 59, Lianyungang City, Jiangsu 222002, P.R. China. (Frombach, MD)

Guam-KH2/KF2XN (OC-026) 20 meters SSB. Full data color picture card via Manager W2GR-Mike Benjamin, 1064 99th Street, Niagara Falls, NY 14304, USA. Received in 60 days for an SASE. (Larry Van Horn-N5FPW, NC)

St. Andreas Island-5K0Z (NA-033). 15 meters SSB. Full data color picture card via DH7WW Ulrich Moeckel, Muldenstrasse 1, 08304 Schoenheide, Germany. Received in seven days for a Euro nested airmail envelope and one US dollar. (Van Horn-NC)

BULGARIA

Radio Bulgaria, 11700 kHz. Full data sea resort scenery card, unsigned, plus program schedule. Received in 122 days for an English report. Station address: 4, Dragan Tsankov Blvd, 1040 Sofia, Bulgaria (or) P.O. Box 900, BG 1000 Sofia, Bulgaria. (Stephen Zolvinski, Columbus, OH)

GERMANY

Deutsche Welle. Full data Cologne card signed by Horst Scholz-Transmission Management, plus TV schedule, DW pocket calender, sticker and *DW Shortwave Receiving Antennas* booklet. Received in 32 days for an English report mailed to: **margot.forbes@dw-world.de** (Kraig Krist-KG4LAC, Annadale, VA) letters may also be sent to: Raderbergguertel 50, D-50968 Cologne, Germany -ed/GVH

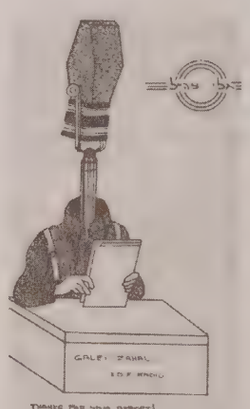
Sudwestrundfunk, 7265. Full data card unsigned. Received in 105 days for an English report. Station address: Hans-Bredow-Strause, D-76530 Baden Baden, Germany. (Joe Wood, Gray, TN)

GUATEMALA

Radio Verdad, 4052.5 kHz. Full data card and letter signed by Dr. Edgar Madrid, plus calendar, schedule, religious literature, and receipt for one dollar. Received in 25 days. Station address: Apartado Postal 5, Chiquimula, Guatemala. (Wood, TN)

ISRAEL

Galei-Zahal (Israel Defense Forces Radio) 6973 kHz. Full data microphone card unsigned. Received in 45 days for an English report and two IRCs. Station address: Military Post Office 1005, Zahal, Israel. (Bill Wilkins, Springfield, MO) Additional freq 15785, station site is 25 km southeast of Tel-Aviv transmitter - *ed./GVH.*



MEDIUM WAVE

KRJO, 1680 kHz AM. Partial data color certificate signed by Russell Kendrick-Chief Engineer, plus bumper sticker. Received in ten days for an AM report and one US dollar. Station address: 1109 Hudson Lane, Monroe, LA 71201. (Bill Wilkins, Springfield, MO)

KTIB, 640 kHz AM. Partial data letter signed by Shane Warner. Received in 18 days for an AM report and one US dollar. Station address: 108 Green St., Thibodaux, LA 70301. (Wilkins, MO)

KQCV, 800 kHz AM. Partial data verification letter on *Bott Radio Network* letterhead, signed by Paul Sublette-General Manager. Also received a KQCV seven function pocket knife. Received in 16 days for an AM report and one US dollar (returned). Station address: 1919 N. Broadway, Oklahoma City, OK 73103. (Wilkins, MO)

KYAA, 1200 kHz AM. Prepared QSL card with note from Don Murray-Program Director KQ6FM. Received in 40 days. Station address: 495 Elder Avenue, Sand City, CA 93955 (ph.: 831-899-2600) (Patrick Martin, Seaside, OR)

WLCR, 1470 kHz AM. Full data form letter signed by David L. Peppers-Chief Engineer. QSL confirms DX Test at 760 watts. Received in 21 days for an AM report, cassette recording and one US dollar. Very pleased with this QSL. At 1,044 miles, that works out to about 1.37 miles per watt! Station address: 3600 Goldsmith Lane, Louisville, KY 40220. (Patrick Griffith-CBT, Westminster, CO)

WTAM, 100 kHz AM. Partial data verification on station letterhead signed by Ray Davis-Program Director, plus two frig magnets. Received in ten days for an AM report, one US dollar (returned) and an address label (used for reply). Station address: 6200 Oak Tree Blvd., 4th Floor, Cleveland, OH 44131-2510. (Wilkins, MO)

XEB, 1220 kHz AM. Full data personal letter signed by Sra. Guadalupe Hurtado Trevino & Santiago Ibarrra Ferrer-Gerente XEB. Received via Federal Express in 21 days for a taped report sent registered mail. In my 40 years I have DX'd medium wave, this is only my 27th QSL from Mexico. Station address: Mayorazgo # 83, Col. Xoco, 03330 Mexico, D.F., Mexico. (Martin, OR)

UNITED STATES

WSHB, 7535 kHz. Verification letter and QSL card signed by C. Riehm, plus station sticker. Received in 20 days for an English report. Station address: 1030 Shortwave Lane, Pineland, SC 29934. (Daniele Canonica, Muggio, Switzerland)

John Figliozzi
johnfigliozzi@monitoringtimes.com

Award-Winning *International* Radio

Last month we discussed excellence in international radio programming. However, we never came to any consensus as to what makes a radio program *international*. Two international radio awards programs – the **New York Radio Festival** and the **Third Coast Festival** – don't offer a definition or even a guideline. Both leave it to the contestants to decide – which begs the question....

Does it matter?

In an era of globalization, in the age of the internet, does it make any difference if a program is designed for an international audience or a domestic one? Has recent history combined with the oft-referenced "telecommunications revolution" to erase all rationale for such a distinction?

Many think so and much of the way in which the various forms of mass media are evolving today seems to reflect that conviction. Yet, it may be useful to pause for a moment and reconsider the question.

❖ A Question of Context

It is said that successful radio, first and foremost, seeks to keep the audience in mind. In this regard, it can be argued that a listener in one part of the world may lack the necessary background to understand the motivation for certain events or ideas in another area of the world. If this is true of, say, an American's understanding of Canadian politics (and it is!), it certainly will be true of countless other international encounters across the airwaves.

If a producer is creating a radio program on a domestic matter for his or her own national audience, that producer may be able assume that the listener already possesses much of the necessary context in which to place what the producer wishes to impart. So the producer will construct the program with that in mind. However, will that context be there for an international audience? If that producer is "keeping the audience in mind," then this has to be a threshold question. If that context is lacking, it will have to be provided and the program will be constructed differently.

In this way, the same program that proves to be great for a domestic audience may be less successful when presented to an international one. So, too, providing needed context for an international listenership might make the program tedious for that domestic audience.

❖ A Fair Competition

Therefore, in leaving the decision to the contestants as to what makes a program "international," are these (New York and Third Coast festival) competitions fairly drawn? Maybe the reference to "international" is intended only to describe the scope or venue of the competition. In that regard, might we still be looking for a truer measure or standard of judgment for international radio? And if we were to attempt to fashion such an awards program, how would we do it? What standards would we apply?

In a sense, we are doing this quite absentmindedly every time we hear a program on the radio. Aren't we?

Until April, good listening!

Third Coast International Audio Festival
http://www.thirdcoastfestival.org

2002
"Affairs of the Mind" - *Street Stories* (***R. Australia*** via ABC Radio National)
"Grey Ghost" - Eureka! (*R. New Zealand Int.* via National Radio)

2001
"Von Trapped" - *Street Stories* (***R. Australia*** via ABC Radio National)

(Several US public radio – NPR, PRI – and independent productions also were recognized.)

Listen to the Winners

Here are the shortwave-related award winners for programs in English from the most recent New York and Chicago festivals, along with some links to internet pages that may provide another opportunity to hear some of them. Listen, enjoy, and evaluate them for yourself!

2002 New York Radio Festival
http://www.nyfests.com

Radio Netherlands
"Van Gogh and Gauguin" - *Aural Tapestry* (Silver WorldMedal for Information/Educational programming. Producer: Marijke Van Der Meer)
"The War Against Terror: The Struggle for Oil" - *Newsline* (Silver WorldMedal for Best News Analysis/Commentary. Producer: Robert Chesal)
"Child Sexual Abuse in Pakistan" - *Wide Angle* (Silver WorldMedal for Best Investigative Report. Producer: Eric Beauchemin)
"Baking Holy Bread" - *The Weekly Documentary* (Bronze WorldMedal for Best Profile/Community Portrait. Producer: Liesbeth De Bakker)
"Dry Winds: Egypt's War of Words" - *The Weekly Documentary* (Finalist Certificate for Best National/International Affairs Program and a United Nations Award Nominee. Producer: Martha Hawley)
"Positively Preventable: Fetal Alcohol Syndrome" - *The Research File* (Finalist Certificate for Best Health/Medical Program. Producer: Laura Durnford)
Radio Netherlands' Latin American Service also received two awards for programs produced in Spanish.
[To hear any or all of these programs, go to **http://www.rnw.nl/en/toolbar/searchstat.html** and enter the name of the program into the search box. Some programs may not be archived.]

Deutsche Welle
Arts on the Air (Gold WorldMedal for Best Culture and Arts Program. Producers: Gudrun Heisse and Breandain O'Shea)
"Coming to Terms with the Legacy of the Past" - *Living in Germany* (Finalist Certificate for Best History Report. Producer: Irene Quaile-Kersken)
"Space Tourism" - *Spectrum* (Finalist Certificate for Best Science and Technology Program. Producer: Rajiv Sharma)
Two joint productions, one in French with R. Nationale Mali and one in Spanish with Radio Vision in Quito, Ecuador also received medals.
[Unfortunately, the DW website **http://www.dw-world.de/english** doesn't appear to archive past editions of programs.]

CBC/RCI
"The Question Show" - *Quirks and Quarks* (Finalist Certificate for Best Educational Program. Producer: Bob McDonald) <cbc.ca/quirks>
(Two CBC-hosted websites **http://www.tuningtheworld.com** and **http://www.cbc.ca/belgrade2001** were awarded gold medals.)

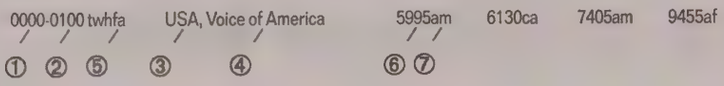
BBCWS
"War Songs" series - *The World Today* (Finalist Certificate for Best Music Special)
"AIDS" - *African Perspective* (Bronze WorldMedal for Best Health/Medical Program)
"Football Tragedy in Ghana" - *Network Africa* (Finalist Certificate for Best Sports Commentary/Analysis)
(Several other BBC-produced programs broadcast only to a domestic audience also received awards.)
[Check at **http://www.bbcworldservice.com** and search the site using these program titles.]

ABC Radio Australia
"Swimming with Nudists" - *Street Stories* (Silver WorldMedal for Best Profiles/Community Portraits Programs)
"Black Angel" - *Encounter* (Finalist Certificate for Best Religious Program. Producer: Lyn Gallacher)
"Coffee, Sex and Other Addictions" - *The Spirit of Things* (Gold WorldMedal for Best Religious Program. Producer: Rachael Kohn)
"Zachary's Tongue" - *Encounter* (Finalist Certificate for Best Religious Program. Producer: Margaret Coffey)
"Bach, The Evangelist" - *Encounter* (Silver WorldMedal for Best Religious Program. Producer: Stephen Watkins)
"The Dingo's Tail: The True History of the Dingo in Australia" - *The Science Show* (Silver WorldMedal for Best Science and Technology Program. Producer: Jonica Newby)
[All are ABC Radio National programs broadcast internationally by *R. Australia*. Many programs are archived at **http://www.abc.net.au/rn**.]

New Dimensions Broadcasting Network
"The Bioneers: Revolution from the Heart of Nature II" (Bronze WorldMedal for Best Environmental Program)
[This program **http://www.newdimensions.org** is syndicated to many stations worldwide. It is heard internationally on shortwave via *R. Australia* and *R. for Peace Int.*]

It also should be noted that ***Radio Free Asia*** received five separate awards for programs with the following titles: "Escape from Tibet: Crossing the Himalayas", "Japan's Responsibility for the Sexual Slavery of Comfort Women", "Red Terrorism During the Chinese Cultural Revolution, "Adopted Chinese Children in America" and "September 11th and Chinatown." (All are in languages other than English.)

How to Use the Shortwave Guide



Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Standard Time) 5, 6, 7, or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all *dates*, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 7:30 pm Eastern, 6:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ① , then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not *daily*, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes	
s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and *MT* readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas	
af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

Selected programs for prime listening hours appear following the frequencies – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT Monitoring Team

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Program Highlights

John Figliozzi

NOTEWORTHY

R. Australia has made some significant changes to its weekday "overnight" (1300-1800 UT) schedule. *The Planet* (M-F 1320) has been reduced by an hour, with that hour filled by a rebroadcast of *The Margaret Throsby Interview* (M-F 1405). *Bush Telegraph* has moved one hour earlier (M-F 1605) and *Australia Talks Back* (M-F 1705) now fills that vacated slot.

BBC World Service welcomes for the first time one of the most popular programs on the BBC's domestic services—*I'm Sorry I Haven't a Clue* (airing A 0406). Chaired by Humphrey Lyttelton (a name longtime WS listeners should recall), regular panelists/comedians Barry Cryer, Graeme Garden and Tim-Brooke Taylor are joined by a guest comic in what *BBC On-Air* calls "a battle of twits". Should be fun.

CAPSULE REVIEW

Feedback
R. Australia
F 2105, A 0005/0605, S 0305

For those who miss *Media Network* and *Communications World*, ***Feedback*** has quietly evolved into the program that best fills that void. While not as expansive or ambitious as *MN* once was, nor as comprehensive on a weekly basis as *CW*, Roger Broadbent regularly uses his weekly half-hour to thoroughly examine matters of topical interest in international broadcasting.

The art of the interview is the method of choice and Broadbent is a consummate interviewer. Whether the topic is technical, such as digital radio broadcasting – or philosophical, such as managerial approaches to programming – the listener is accorded the full benefit of a calm and inquiring mind whose questions (and the answers they produce) always provide the listener with a fuller understanding, whatever the subject.

Often, the listener is asked to provide additional perspective and the program returns to subjects as circumstances warrant. It may just be this sense of continuing dialogue that makes ***Feedback*** unique in this genre. [Note: In addition to shortwave, ***Feedback*** also can be heard on the internet **http://www.abc.net.au/ra** at the times indicated and on World Radio Network at 0300ET.]

0000 UTC - 7PM E / 6PM C / 4PM P

0000	0015		Cambodia, National Radio Of	11940as				
0000	0015		Japan, Radio	6145na	13650as	17810as		
0000	0030		Austria, Radio Austria Intl	9870eu				
0000	0030	as	Austria, Radio Austria Intl	13730eu				
0000	0030		Egypt, Radio Cairo	9900am				
0000	0030	mtwhf/vl	Solomon Islands, SIBC	5020do	9545do			
0000	0030		Sri Lanka, SLBC	4940as				
0000	0030		Thailand, Radio	9680va				
0000	0030		UK, BBC World Service	3915as	5970as	11945as	17615as	
0000	0045		India, All India Radio	9705as	9950as	11620as	13605as	
0000	0055		Spain, R Exterior Espana	6055am				
0000	0057		Canada, Radio Canada Intl	9755as	11895as	9755as	11895as	
0000	0059		Canada, Radio Canada Intl	5960na	9590na			
0000	0100		Anguilla, Caribbean Beacon	6090am				
0000	0100		Australia, ABC NT Alice Springs	4810eu	9960eu			
0000	0100		Australia, ABC NT Katherine	5025do				
0000	0100		Australia, ABC NT Tennant Crk	4910do				
0000	0100		Australia, Radio	5995va	9475as	9580va	9660pa	11650va
			11660as 12080va	15240pa	15415as	17775as	17580pa	17795va
			21725va					
0000	0100		Bulgaria, Radio	7400na	9400na			
0000	0100		Canada, CBC Northern Service	9625do				
0000	0100		Canada, CFRX Toronto ON	6070do				
0000	0100		Canada, CFVP Calgary AB	6030do				
0000	0100		Canada, CKZN St John's NF	6160do				
0000	0100		Canada, CKZU Vancouver BC	6160do				
0000	0100		Costa Rica, R for Peace Intl	7445am	15040am			
0000	0100		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na					
0000	0100		Germany, Deutsche Welle	6040am	6145am	9640am	9700na	
			9765na					
0000	0100		Guyana, Voice of	3290do	5950do			
0000	0100		Malaysia, Radio	7295do				
0000	0100		Namibia, NBC	3270af	3290af			
0000	0100		Netherlands, Radio	6165na	9845na			
0000	0100		New Zealand, Radio NZ Intl	17675pa				
0000	0100		Russia, University Network	9890as				
0000	0100		Singapore, SBC Radio One	6150do				
0000	0100		UAE, AWR	6035as	6055as			
0000	0100		UK, BBC World Service	5975va	6195as	7105as	9410va	9825sa
			11955as 12095va	15280as	15310as	15360as	17790as	
0000	0100		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb 6458usb	10320usb	12579usb	12689usb	13362usb	
0000	0100		USA, KAIJ Dallas TX	5755va				
0000	0100		USA, KIMF Otero NM	5835na				
0000	0100		USA, KTBN Salt Lk City UT	7505na				
0000	0100		USA, KWHR Naalehu HI	17510as				
0000	0100		USA, Voice of America	7215va	9890va	11760va	15185va	15290va
			17740va 17820va					
0000	0100	twhfa	USA, Voice of America	5995am	6130am	7405am	9455am	9775am
			11695am 13710am					
0000	0100		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na		
0000	0100		USA, WEWN Birmingham AL	5825na				
0000	0100		USA, WHRA Greenbush ME	7580va				
0000	0100		USA, WHRI Noblesville IN	5745va	7315am			
0000	0100		USA, WINB Red Lion PA	12160am				
0000	0100		USA, WJIE Louisville KY	7490am	13595am			
0000	0100	sm	USA, WRMI Miami FL	9955am				
0000	0100	twhfa	USA, WRMI Miami FL	7385na				
0000	0100		USA, WRNO New Orleans LA	7355am				
0000	0100	as	USA, WSHB Cypress Creek SC	9430am				
0000	0100	wf	USA, WSHB Cypress Creek SC	9430am	15285am			
0000	0100		USA, WTJC Newport NC	9370na				
0000	0100	sm	USA, WWBS Macon GA	11900na				
0000	0100		USA, WWCR Nashville TN	3210na	5070na	5935na	7465na	
0000	0100		USA, WWRB Manchester TN	5050na	5085na	6890na		
0000	0100		USA, WYFR Okeechobee FL	6085na	9505na	11720na		
0000	0100	vl	Vanuatu, Radio	3945al	7260do			
0000	0100		Zambia, Christian Voice	4965do				
0000	0130		UAE, Gospel For Asia	6145as				
0005	0012		Croatia, Croatian Radio	9925sa				
0030	0100		Australia, Radio	17750as				
0030	0100		Iran, VOIRI	6015am	6120am	9580am		
0030	0100		Lithuania, R Vilnius	7325na				
0030	0100	as	Russia, Bible Voice BC	12035as				
0030	0100	as	Russia, Bible Voice BC	12035as				
0030	0100	as/vl	Solomon Islands, SIBC	5020do	9545do			
0030	0100		Sri Lanka, SLBC	4940as	6005as	6075as	9770as	15745as
0030	0100		Thailand, Radio	13695na				
0045	0100		Pakistan, Radio	11655as	15455as			
0055	0100		Italy, RAI Intl	9675na	11800na			

0100 UTC - 8PM E/ 7PM C / 5PM P

0100	0115		Italy, RAI Intl	9675na	11800na			
0100	0115		Pakistan, Radio	11655as	15455as			
0100	0125		Netherlands, Radio	6165na	9845na			
0100	0127		Czech Rep, Radio Prague Intl	6200na	7345na			
0100	0127		Iran, VOIRI	6015na	6120na	9580am		
0100	0127		Vietnam, Voice of	6175na				
0100	0130		Australia, Radio	17775as				
0100	0130	s	Germnay, Universal Life	9435as				
0100	0130		Hungary, Radio Budapest	9835na				
0100	0130	as	Russia, Bible Voice BC	12035as				
0100	0130	mtwhfa	Serbia/Montenegro, R Yugoslavia	7115eu				
0100	0130		Slovakia, R Slovakia Intl	5930am	7230am	9440am		
0100	0130		UAE, Gospel For Asia	6145as				
0100	0130	twhfa	USA, Voice of America	5995am	6130am	7405am	9455am	9775am
			13710am					
0100	0130		Uzbekistan, Radio Tashkent	5955as	5975as	7135as	7215as	
0100	0145		Germany, Deutsche Welle	6040am	6145am	9640am	9700na	
			9765na					
0100	0156		China, China Radio Intl	9580na	9790na			
0100	0156		North Korea, Voice of	3560as	6195as	6520am	7140as	7580am
			9345as 11735am					
0100	0200		Anguilla, Caribbean Beacon	6090am				
0100	0200		Australia, ABC NT Katherine	5025do				
0100	0200		Australia, ABC NT Tennant Crk	4910do				
0100	0200		Australia, Radio	5995va	9475as	9580va	9660pa	
			11650va 11660va	12080va	15240pa	15415as	17750as	
			17580pa 17795va	21725va				
0100	0200	vl	Austria, AWR	9835as				
0100	0200		Canada, CBC Northern Service	9625do				
0100	0200		Canada, CFRX Toronto ON	6070do				
0100	0200		Canada, CFVP Calgary AB	6030do				
0100	0200		Canada, CKZN St John's NF	6160do				
0100	0200		Canada, CKZU Vancouver BC	6160do				
0100	0200		Costa Rica, R for Peace Intl	7445am	15040am			
0100	0200		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na					
0100	0200		Cuba, Radio Havana	6090na	9820na	11705usb		
0100	0200		Ecuador, HCJB	9745na	21455usb			
0100	0200		Guyana, Voice of	3290do	5950do			
0100	0200		Indonesia, Voice of	9525va				
0100	0200		Japan, Radio	11860as	11880af	15325as	17685oc	
			17810as 17835sa	17845na				
0100	0200		Kyrghyz, Kyrghyz Radio	4010as	4795as			
0100	0200		Namibia, NBC	3270af	3290af			
0100	0200		New Zealand, Radio NZ Intl	17675pa				
0100	0200		Russia, University Network	9890as				
0100	0200		Singapore, SBC Radio One	6150do				
0100	0200	vl	Solomon Islands, SIBC	5020do	9545do			
0100	0200		Sri Lanka, SLBC	4940as	6005as	6075as	9770as	
			15745as					
0100	0200		UK, BBC World Service	5975va	6195as	9410as	9525sa	9825am
			11955as 12095va	15280as	15310as	15360as	17790as	
0100	0200		Ukraine, R Ukraine Intl	5905as	7375as	9610as		
0100	0200		USA, Armed Forces Network	3903usb	4278usb	4319usb		
			4993usb 6350usb	6458usb	10320usb	12579usb	12689usb	
			13362usb					
0100	0200		USA, KAIJ Dallas TX	5755va				
0100	0200		USA, KIMF Otero NM	5835na				
0100	0200		USA, KTBN Salt Lk City UT	7505na				
0100	0200		USA, KWHR Naalehu HI	17510as				
0100	0200		USA, Voice of America	7200va	9850va	11705va	11820va	
			15250va 15300va	17740va	17820va			
0100	0200		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na		
0100	0200		USA, WEWN Birmingham AL	5825na				
0100	0200		USA, WHRA Greenbush ME	7580va				
0100	0200		USA, WHRI Noblesville IN	5745va	7315am			
0100	0200		USA, WINB Red Lion PA	12160am				
0100	0200		USA, WJIE Louisville KY	7490am	13595am			
0100	0200	sm	USA, WRMI Miami FL	9955am				
0100	0200	twhfa	USA, WRMI Miami FL	7385na				
0100	0200		USA, WRNO New Orleans LA	7355am				
0100	0200	twhfas	USA, WSHB Cypress Creek SC	9430na				
0100	0200		USA, WTJC Newport NC	9370na				
0100	0200	sm	USA, WWBS Macon GA	11900na				
0100	0200		USA, WWCR Nashville TN	3210na	5070na	5935na	7465na	
0100	0200		USA, WWRB Manchester TN	5050na	5085na	6890na		

SELECTED PROGRAMMING BEGINS ON PAGE 55

0100	0200		USA, WYFR Okeechobee FL	6065na	9505na	15060as		
0100	0200		Zambia, Christian Voice	4965do				
0110	0200	as	Australia, Radio	9660va	12080pa	17580pa	21725as	
0130	0145	vl	Libya, Voice of Africa	15435irr	21695irr			
0130	0200		Australia, Voice International	17775as				
0130	0200		Iran, VOIRI 6120na	9580na				
0130	0200		Sweden, Radio	9495as				
0130	0200		UK, RTE Radio	6155na				
0130	0200	twhfa	USA, Voice of America	5995am	6130am	7405am	9455am	9775am
			13740am					
0138	0150		Croatia, Croatian Radio	9925sa				
0140	0200		Vatican City, Vatican Radio	7335as	9865as			

0200 UTC - 9PM E / 8PM C / 6PM P

0200	0210		Bangladesh, Bangla Betar	4882as				
0200	0227		Czech Rep, Radio Prague Intl	6200na	7345na			
0200	0227		Iran, VOIRI 6120na	9580na				
0200	0228		Hungary, Radio Budapest	9835na				
0200	0230	twhfa	Argentina, RAE	11710am				
0200	0230		Serbia/Montenegro, R Yugoslavia	7130eu				
0200	0230	as/vl	Solomon Islands, SIBC	5020do	9545do			
0200	0245		Germany, Deutsche Welle	7285as	9765as	11965as	13605as	
0200	0256		North Korea, Voice of	4405as	9325as	11335as	11845as	
0200	0256		Romania, R Romania Intl	9550na	9625as	11740as		
			11830na 15370au					
0200	0257		Canada, Radio Canada Intl	15150as	17860as			
0200	0259		Canada, Radio Canada Intl	6040am	9755am	11725am		
0200	0300		Anguilla, Caribbean Beacon	6090am				
0200	0300		Australia, ABC NT Alice Springs	4810eu	9960eu			
0200	0300		Australia, ABC NT Katherine	5025do				
0200	0300		Australia, ABC NT Tennant Crk	4910do				
0200	0300		Australia, Radio	5995va	9475as	9580va	9660pa	11650va
			12080va 15240pa	15415as	15515as	17580pa	17750as	21725va
0200	0300	as	Australia, Radio	9660va	12080pa	17580pa	21725as	
0200	0300		Canada, CBC Northern Service	9625do				
0200	0300		Canada, CFRX Toronto ON	6070do				
0200	0300		Canada, CFVP Calgary AB	6030do				
0200	0300		Canada, CKZN St John's NF	6160do				
0200	0300		Canada, CKZU Vancouver BC	6160do				
0200	0300		Costa Rica, R for Peace Intl	7445am	15040am			
0200	0300		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na					
0200	0300		Cuba, Radio Havana	6090na	9820na	11705usb		
0200	0300		Ecuador, HCJB	9745na	12040as	21455usb		
0200	0300		Egypt, Radio Cairo	9475am				
0200	0300		Guyana, Voice of	3290do	5950do			
0200	0300		Malaysia, Radio	7295do				
0200	0300		Myanmar, Radio	7185do				
0200	0300		Namibia, NBC	3270af	3290af			
0200	0300		New Zealand, Radio NZ Intl	17675pa				
0200	0300		Philippines, Radio Pilipinas	12015me	15120me	15270me		
0200	0300		Russia, University Network	9890as				
0200	0300		Russia, Voice of Russia	6155na	7180na	9765na	12020na	
			13665na 15445na					
0200	0300		Singapore, SBC Radio One	6150do				
0200	0300	mtwhf/vl	Solomon Islands, SIBC	5020do	9545do			
0200	0300		South Korea, R Korea Intl	9560va	11810va	15575va		
0200	0300		Sri Lanka, SLBC	6005as	6075as	6130do	9770as	15745as
0200	0300		Taiwan, R Taipei Intl	5950na	9680na	11740na	15320as	15345as
0200	0300		UK, BBC World Service	5975va	6005af	9410me	9525am	9770af
			9825sa 11760va	11955as	12035af	12095va	15280as	15310as
			15360as 17790as					
0200	0300		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb 6458usb	10320usb	12579usb	12689usb	13362usb	
0200	0300		USA, KAIJ Dallas TX	5755va				
0200	0300		USA, KIMF Otero NM	5835na				
0200	0300		USA, KJES Vado NM	7555na				
0200	0300		USA, KTBN Salt Lk City UT	7505na				
0200	0300		USA, KWHR Naalehu HI	17510as				
0200	0300		USA, Voice of America	7200va	9850va	11705va	11820va	15250va
			15300va 17740va	17820va				
0200	0300		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na		
0200	0300		USA, WEWN Birmingham AL	5825na				
0200	0300		USA, WHRA Greenbush ME	7580va				
0200	0300		USA, WHRI Noblesville IN	5745va	7315am			
0200	0300		USA, WINB Red Lion PA	9320am				
0200	0300		USA, WJIE Louisville KY	7490am	13595am			
0200	0300	sm	USA, WRMI Miami FL	9955am				
0200	0300	twhfa	USA, WRMI Miami FL	7385na				
0200	0300		USA, WRNO New Orleans LA	7355am				
0200	0300	s	USA, WSHB Cypress Creek SC	9430na				
0200	0300	h	USA, WSHB Cypress Creek SC	7535am				
0200	0300		USA, WTJC Newport NC	9370na				
0200	0300		USA, WWCR Nashville TN	3210na	5070na	5935na	7465na	
0200	0300		USA, WWRB Manchester TN	5050na	5085na	6890na		
0200	0300		USA, WYFR Okeechobee FL	6065na	9505na			
0200	0300		Zambia, Christian Voice	4965do				
0200	1215		Cambodia, National Radio Of	11940as				
0205	0222		Croatia, Croatian Radio	9925na				
0215	0220		Nepal, Radio	3230as	5005as	6100as	7164as	
0230	0257		Vietnam, Voice of	6175na				
0230	0300		Austria, Radio Austria Intl	7325na				
0230	0300		Iraq, Radio Iraq Intl	9687irg	11787eu			
0230	0300		Sweden, Radio	9495na				
0245	0300	twhfa	Albania, Radio Tirana Intl	6115na	7160eu			
0250	0300		Vatican City, Vatican Radio	7305am	9605am			

0300 UTC - 10PM E / 9PM C / 7PM P

0300	0310		Vatican City, Vatican Radio	7305am	9605am	9660af		
0300	0330		Australia, Radio	9580va				
0300	0330	sm w fa	Belarus, Radio Belarus Intl	5970eu	7210eu			
0300	0330		Egypt, Radio Cairo	9475am				
0300	0330		South Africa, Channel Africa	9525af				
0300	0330		Thailand, Radio	15460na				
0300	0330	a	UK, Wales Radio Intl	9835na				
0300	0330		USA, KJES Vado NM	7555na				
0300	0345		Germany, Deutsche Welle	6020na	6045na	9640am	9700na	
			11985na					
0300	0356		China, China Radio Intl	9560na				
0300	0356		North Korea, Voice of	3560as	6195as	7140as	9345as	
0300	0400		Anguilla, Caribbean Beacon	6090am				
0300	0400		Australia, ABC NT Alice Springs	4810eu	9960eu			
0300	0400		Australia, ABC NT Katherine	5025do				
0300	0400		Australia, ABC NT Tennant Crk	4910do				
0300	0400		Australia, Radio	5995va	9500pa	9660pa	9815pa	11650va
			12080va 15240pa	15415as	15515va	17580pa	17750as	21725va
0300	0400	as	Australia, Radio	9660va	12080pa	17580pa	21725as	
0300	0400	vl	Botswana, Radio	3356do	4820do	7255do		
0300	0400		Bulgaria, Radio	7400na	9400na			
0300	0400		Canada, CBC Northern Service	9625do				
0300	0400		Canada, CFRX Toronto ON	6070do				
0300	0400		Canada, CFVP Calgary AB	6030do				
0300	0400		Canada, CKZN St John's NF	6160do				
0300	0400		Canada, CKZU Vancouver BC	6160do				
0300	0400		Costa Rica, R for Peace Intl	7455am	15040am			
0300	0400		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na	17645as				
0300	0400		Cuba, Radio Havana	6090na	9820na	11705usb		
0300	0400		Ecuador, HCJB	9745na	12040as	21455usb		
0300	0400	vl	Guatemala, Radio Cultural	5955do				
0300	0400		Guyana, Voice of	3290do	5950do			
0300	0400		Japan, Radio	17825ca	21610oc			
0300	0400		Malaysia, Radio	7295do				
0300	0400		Namibia, NBC	3270af	3290af			
0300	0400		New Zealand, Radio NZ Intl	17675pa				
0300	0400		Oman, Radio	15355af				
0300	0400		Russia, University Network	9890as				
0300	0400		Russia, Voice of Russia	6155na	7180na	12020na	13665na	
			15445na					
0300	0400		Singapore, SBC Radio One	6150do				
0300	0400	mtwhf/vl	Solomon Islands, SIBC	5020do	9545do			
0300	0400		Sri Lanka, SLBC	6005as	6075as	6130do	9770as	15745as
0300	0400		Taiwan, R Taipei Intl	5950na	9680na	11875as	15320as	
0300	0400		Uganda, Radio	4976do	5026do	7196do		
0300	0400		UK, BBC World Service	3255af	5975va	6005af	6190af	6195eu
			7160af 9410va	9525am	11760va	11765af	12035af	12095as
			15280as 15310as	15360as	15575va	17640as	17760as	17790as
			21660as					
0300	0400		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb 6458usb	10320usb	12579usb	12689usb	13362usb	
0300	0400		USA, KAIJ Dallas TX	5755va				
0300	0400		USA, KIMF Otero NM	5835na				
0300	0400		USA, KTBN Salt Lk City UT	7505na				
0300	0400		USA, KWHR Naalehu HI	17510as				
0300	0400		USA, Voice of America	4960af	6035af	6080af	7265af	7290af
			7340af 7415af	9575af	9885af			
0300	0400		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na		
0300	0400		USA, WEWN Birmingham AL	5825na				
0300	0400		USA, WHRA Greenbush ME	7580va				
0300	0400		USA, WHRI Noblesville IN	5745va	7315am			
0300	0400		USA, WINB Red Lion PA	9320am				
0300	0400		USA, WJIE Louisville KY	7490am	13595am			
0300	0400		USA, WRMI Miami FL	7385na				
0300	0400		USA, WRNO New Orleans LA	7395am				
0300	0400		USA, WTJC Newport NC	9370na				
0300	0400		USA, WWCR Nashville TN	3210na	5070na	5935na	7465na	

0300	0400		USA, WWRB Manchester TN	5050na	5085na	6890na	
0300	0400		USA, WYFR Okeechobee FL 11855na	5985na	6065na	9505na	
0300	0400		Zambia, Christian Voice	6065do			
0310	0330		Vatican City, Vatican Radio	9660af			
0330	0345	vl	Libya, Voice of Africa	15435irr	21695irr		
0330	0350		UAE, Emirates Radio	12005na	13675na	15395na	
0330	0357		Vietnam, Voice of	6175na			
0330	0358		Hungary, Radio Budapest	9835na			
0330	0400	twhfa	Albania, Radio Tirana Intl	6115na	7160eu		
0330	0400		Malaysia, RTM Kota Kinabalu	5979do			
0330	0400		Nigeria, Radio/Kaduna	4770do			
0330	0400		Nigeria, Radio/Lagos	3326do	4990al		
0330	0400		Sweden, Radio	9495na			
0330	0400		UK, BBC World Service	15420af			
0338	0350		Croatia, Croatian Radio	9925na			
0345	0400	s hf	Seychelles, FEBA Radio	11885af			
0345	0400		Tajikistan, Radio	7245as			

0400 UTC - 11PM E / 10PM C / 8PM P

0400	0425		Belgium, Radio Vlaanderen Intl	11985na			
0400	0427		Czech Rep, Radio Prague Intl	7345na	7385na	9435na	
0400	0430	mtwhf	France Radio France Intl	11910af	11995af		
0400	0430	vl	Guatemala, Radio Cultural	5955do			
0400	0430	s twhfa	Mexico, Radio Mexico Intl	9705am	11770am		
0400	0430		South Africa, AWR	9650af			
0400	0430		South Africa, Channel Africa	5955af			
0400	0430		Sri Lanka, SLBC	6005as	6075as	6130do	9770as 15745as
0400	0445		Germany, Deutsche Welle 15410af	6180af	7195af	9565af	9710af
0400	0445		USA, WYFR Okeechobee FL	6065na	9505na	9985eu	11530eu
0400	0450		Turkey, Voice of	6020va	7240va		
0400	0456		China, China Radio Intl	9730na			
0400	0456		Romania, R Romania Intl	9550na	11830na	15335as	17735as
0400	0500		Anguilla, Caribbean Beacon	6090am			
0400	0500		Australia, ABC NT Alice Springs	4810eu	9960eu		
0400	0500		Australia, ABC NT Katherine	5025do			
0400	0500		Australia, ABC NT Tennant Crk	4910do			
0400	0500		Australia, Radio 9815pa 11650va 17580pa 21725va	5995va	6080pa 12080va	7240pa 15240pa	9500as 9660pa 15415as 15515va
0400	0500	as	Australia, Radio	9660va	12080pa	17580pa	21725as
0400	0500	vl	Botswana, Radio	3356do	4820do	7255do	
0400	0500		Canada, CBC Northern Service	9625do			
0400	0500		Canada, CFRX Toronto ON	6070do			
0400	0500		Canada, CKZN St John's NF	6160do			
0400	0500		Canada, CKZU Vancouver BC	6160do			
0400	0500		Costa Rica, R for Peace Intl	7455am	15040am		
0400	0500		Costa Rica, University Network 11870am 13750na 17645as	5030am	6150am	7375am	9725sa
0400	0500		Cuba, Radio Havana	6090na	9820na	11705usb	
0400	0500		Ecuador, HCJB	9745na	21455usb		
0400	0500		Guyana, Voice of	3290do	5950do		
0400	0500		Malaysia, Radio	7295do			
0400	0500		Malaysia, RTM Kota Kinabalu	5979do			
0400	0500		Namibia, NBC	3270af	3290af		
0400	0500		New Zealand, Radio NZ Intl	17675pa			
0400	0500		Nigeria, Radio/Kaduna	4770do	6090do		
0400	0500		Nigeria, Radio/Lagos	3326do	4990al		
0400	0500		Russia, University Network	17765as			
0400	0500		Russia, Voice of Russia 15445na 15595na 17595na	7125na	7180na	12020na	13665na
0400	0500	mtwhfa	Russia, Voice of Russia	12010na			
0400	0500		Singapore, SBC Radio One	6150do			
0400	0500	mtwhf/vl	Solomon Islands, SIBC	5020do	9545do		
0400	0500		Uganda, Radio	4976do	5026do	7196do	
0400	0500		UK, BBC World Service 6195af 7160va 9410am 12095as 15280as 17760as 17790as	3255af	5975af 9525va	6005am 11760af	6135af 6190eu 11765af 12035as 15310as 15360af 15420va 15575as 17640as 21660as
0400	0500		Ukraine, R Ukraine Intl	7285as	7375as	7420as	
0400	0500		USA, Armed Forces Network 6350usb 6458usb	3903usb	4278usb 10320usb	4319usb 12579usb	4993usb 12689usb 13362usb
0400	0500		USA, KAIJ Dallas TX	5755va			
0400	0500		USA, KIMF Otero NM	5835na			
0400	0500		USA, KTBN Salt Lk City UT	7505na			
0400	0500		USA, KWHR Naalehu HI	17780as			
0400	0500		USA, Voice of America 9775af 9885af 15205af	4960af	6080af	7170va	7290af 9525af
0400	0500		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na	
0400	0500		USA, WEWN Birmingham AL	5825na			
0400	0500		USA, WHRA Greenbush ME	7580va			
0400	0500		USA, WHRI Noblesville IN	5745va	7315am		
0400	0500		USA, WJIE Louisville KY	7490am	13595am		
0400	0500		USA, WMLK Bethel PA	9465eu	9955eu		
0400	0500		USA, WRMI Miami FL	7385na			
0400	0500		USA, WRNO New Orleans LA	7395am			
0400	0500	tha	USA, WSHB Cypress Creek SC	12020af			
0400	0500		USA, WTJC Newport NC	9370na			
0400	0500		USA, WWCR Nashville TN	3210na	5070na	5935na	7465na
0400	0500		USA, WWRB Manchester TN	5950na	5085na	6890na	
0400	0500		Zambia, Christian Voice	6065do			
0404	0500		USA, WYFR Okeechobee FL	9715na			
0405	0412		Croatia, Croatian Radio	9925na			
0427	0500	smt a	Madagascar, Radio VO Hope	12060af	15320af		
0430	0457		Czech Rep. Radio Prague Intl	9865va	11600va		
0430	0500		Australia, Radio	17750as			
0430	0500		Netherlands, Radio	6165na	9590na		
0430	0500		Nigeria, Radio/Enugu	6025do			
0430	0500		Nigeria, Radio/Ibadan	6050do			
0430	0500		South Africa, AWR	12080af			
0430	0500		Sri Lanka, SLBC	6130do			
0430	0500		Swaziland, TWR	4775af	6120af		
0430	0500		UAE, AWR	15160as			
0445	0500		Italy, RAI Intl	5965af	6100af	7235af	
0450	0800	a	Monaco, TWR	9870eu			

0500 UTC - 12AM E / 11PM C / 9PM P

0500	0505		New Zealand, Radio NZ Intl	17675pa			
0500	0515		Israel, Kol Israel	9435va	11605va	17600va	
0500	0530		Australia, Radio	9500as			
0500	0530	mtwhf	France Radio France Intl	13610af	15155af		
0500	0530	s twhfa	Mexico, Radio Mexico Intl	9705am	11770am		
0500	0530		Netherlands, Radio	6165na	9590na		
0500	0530		South Africa, AWR	6015af			
0500	0530		South Africa, Channel Africa	11710af			
0500	0530		UK, BBC World Service	15280as			
0500	0530		Vatican City, Vatican Radio	9660af	11625af	15570af	
0500	0545		Germany, Deutsche Welle 11795na	5960na	6120na	9670na	
0500	0556		China, China Radio Intl	9560na			
0500	0600		Anguilla, Caribbean Beacon	6090am			
0500	0600		Australia, ABC NT Alice Springs	4810eu	9960eu		
0500	0600		Australia, ABC NT Katherine	5025do			
0500	0600		Australia, ABC NT Tennant Crk	4910do			
0500	0600		Australia, Radio 11880va 12080va	5995va	6080pa 15240pa	7240pa 15415as	9660pa 9815pa 15515va 17580pa 21725va
0500	0600	as	Australia, Radio	9660va	12080pa	17580pa	21725as
0500	0600	mtwhf	Bhutan, Bhutan BC Service	5030al	6035do		
0500	0600	vl	Botswana, Radio	3356do	4820do	7255do	
0500	0600		Canada, CBC Northern Service	9625do			
0500	0600		Canada, CFRX Toronto ON	6070do			
0500	0600		Canada, CKZN St John's NF	6160do			
0500	0600		Canada, CKZU Vancouver BC	6160do			
0500	0600		Costa Rica, R for Peace Intl	7455am	15040am		
0500	0600		Costa Rica, University Network 11870am 13750na 17645as	5030am	6150am	7375am	9725sa
0500	0600		Cuba, Radio Havana	9550na	9820na	9830usb	
0500	0600		Ecuador, HCJB	9745na	21455usb		
0500	0600		Guyana, Voice of	3290do	5950do		
0500	0600		Japan, Radio 13630na 15195as	5975eu	6110na 17810as	7230eu 21755oc	9835eu 15195as
0500	0600		Kuwait, Radio	15110as			
0500	0600		Malaysia, Radio	7295do			
0500	0600		Malaysia, RTM Kota Kinabalu	5979do			
0500	0600		Namibia, NBC	6060af	6175af		
0500	0600		Nigeria, Radio/Enugu	6025do			
0500	0600		Nigeria, Radio/Ibadan	6050do			
0500	0600		Nigeria, Radio/Kaduna	4770do	6090do	9570do	
0500	0600		Nigeria, Radio/Lagos	3326do	4990al		
0500	0600		Nigeria, Voice of	7255af	15150af		
0500	0600		Russia, University Network	17765as			
0500	0600	mtwhf	Russia, Voice of Russia	12010na			
0500	0600		Russia, Voice of Russia 15445na 15595na	7180na	7180na	12020na	13665na
0500	0600		Singapore, SBC Radio One	6150do			
0500	0600	vl	Solomon Islands, SIBC	5020do	9545do		
0500	0600		Swaziland, TWR	6120af	7205af	9500af	
0500	0600		Uganda, Radio	4976do	5026do	7196do	
0500	0600		UK, BBC World Service 9410va 11760va 15420af 15565va 21660as	6005af	6135am 11765af 15575va	6190af 11940af 17640af	6195eu 7160af 11955as 15310as 15360as 17760as 17790as 17885af
0500	0600		USA, Armed Forces Network 6350usb 6458usb	3903usb	4278usb 10320usb	4319usb 12579usb	4993usb 12689usb 13362usb
0500	0600		USA, KAIJ Dallas TX	5755va			

0500	0600		USA, KIMF Otero NM	5835na				
0500	0600		USA, KTBN Salt Lk City UT	7505na				
0500	0600		USA, KWHR Naalehu HI	17780as				
0500	0600		USA, Voice of America	6035af	6080af	7170va	7295af	9700va
			11825va	11835af	13710af	15205va		
0500	0600		USA, WBCQ Kennebunk, ME	7415na				
0500	0600	twhfa	USA, WBCQ Kennebunk, ME	9335na				
0500	0600		USA, WEWN Birmingham AL	5825na				
0500	0600		USA, WHRA Greenbush ME	7580va				
0500	0600		USA, WHRI Noblesville IN	5745va	7315am			
0500	0600		USA, WJIE Louisville KY	7490am	13595am			
0500	0600		USA, WMLK Bethel PA	9465eu	9955eu			
0500	0600		USA, WRMI Miami FL	7385na				
0500	0600		USA, WRNO New Orleans LA	7395am				
0500	0600	twhfas	USA, WSHB Cypress Creek SC	12020af				
0500	0600		USA, WTJC Newport NC	9370na				
0500	0600		USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
0500	0600		USA, WWRB Manchester TN	5950na	5085na	6890na		
0500	0600		USA, WYFR Okeechobee FL	5810na				
0500	0600		Zambia, Christian Voice	6065do				
0506	0600		New Zealand, Radio NZ Intl	15340pa				
0525	0600	vl	Ghana, Ghana BC Corp	3366do	4915do			
0530	0550		UAE, Emirates Radio	15435au	17830au	21695au		
0530	0600		Australia, Radio	17750as				
0530	0600		South Africa, AWR	15345af				
0530	0600		Thailand, Radio	13780eu				
0538	0550		Croatia, Croatian Radio	9925na				

0600 UTC - 1AM E / 12AM C / 10PM P

0600	0615		South Africa, TWR	11640af				
0600	0620		Vatican City, Vatican Radio	4005af	5890eu	7250eu		
0600	0630	mtwhf	France Radio France Intl	11710af	15155af			
0600	0630		South Africa, Channel Africa	15215af				
0600	0637		Romania, R Romania Intl	9530na	11829na			
0600	0645		Germany, Deutsche Welle	7225af	9565af	11785af		
0600	0700		Anguilla, Caribbean Beacon	6090am				
0600	0700		Australia, ABC NT Alice Springs	4810eu	9960eu			
0600	0700		Australia, ABC NT Katherine	5025do				
0600	0700		Australia, ABC NT Tennant Crk	4910do				
0600	0700		Australia, Radio	7240va	9660pa	9815pa	11880va	12080va
			13620as	15320as	15240pa	15415as	15515va	17580pa	17750as
			21725va					
0600	0700	as	Australia, Radio	9660va	12080pa	17580pa	21725as	
0600	0700		Canada, CFRX Toronto ON	6070do				
0600	0700		Canada, CFVP Calgary AB	6030do				
0600	0700		Canada, CKZN St John's NF	6160do				
0600	0700		Canada, CKZU Vancouver BC	6160do				
0600	0700		Costa Rica, R for Peace Intl	7455am	15040am			
0600	0700		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
0600	0700		Cuba, Radio Havana	9550na	9820na	9830usb		
0600	0700		Germany, Deutsche Welle	6140eu				
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do			
0600	0700		Greece, Voice of	9420eu	15630eu			
0600	0700		Guyana, Voice of	3290do	5950do			
0600	0700		Japan, Radio	7230eu	9835na	11715va	11760va	11740as
			15195as	17870pa	21755oc			
0600	0700		Kuwait, Radio	15110as				
0600	0700		Liberia, ELWA	4760do				
0600	0700		Liberia, R Liberia Intl	6100do				
0600	0700		Malaysia, Radio	7295do				
0600	0700		Malaysia, Voice of	6175as	9750as	15295as		
0600	0700		Namibia, NBC	3270af	3290af			
0600	0700		New Zealand, Radio NZ Intl	15340pa				
0600	0700		Nigeria, Radio/Enugu	6025do				
0600	0700		Nigeria, Radio/Ibadan	6050do				
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
0600	0700		Nigeria, Radio/Lagos	3326do	4990al			
0600	0700		Nigeria, Voice of	7255af	15150af			
0600	0700		Russia, University Network	17765as				
0600	0700		Russia, Voice of Russia	15275au	17665au	21790au		
0600	0700		Singapore, SBC Radio One	6150do				
0600	0700	vl	Solomon Islands, SIBC	5020do	9545do			
0600	0700		Swaziland, TWR	6120af	7205af	9500af		
0600	0700		Uganda, Radio	4976do	5026do	7196do		
0600	0700		UK, BBC World Service	6055af	6190af	6195eu	7160af	9410va
			11765af	11940af	11955as	12095va	15310as	15360as	15565va
			15575va	17640af	17760as	17790as	17885af	21660as	
0600	0700		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb	6458usb	10320usb	12579usb	12689usb	13362usb	
0600	0700		USA, KALJ Dallas TX	5755va				
0600	0700		USA, KIMF Otero NM	5835na				
0600	0700		USA, KTBN Salt Lk City UT	7505na				
0600	0700		USA, KWHR Naalehu HI	17780as				
0600	0700		USA, Voice of America	5995va	6035af	6080af	6105af	7170af
			7295va	11825af	11835va	11930af	11995va	13710af	15205af
0600	0700		USA, WBCQ Kennebunk, ME	7415na				
0600	0700		USA, WEWN Birmingham AL	5825na				
0600	0700		USA, WHRA Greenbush ME	7580va				
0600	0700		USA, WHRI Noblesville IN	5745va	7315am			
0600	0700		USA, WJIE Louisville KY	7490am	13595am			
0600	0700		USA, WMLK Bethel PA	9465eu	9955eu			
0600	0700		USA, WRMI Miami FL	7385na				
0600	0700		USA, WRNO New Orleans LA	7395am				
0600	0700	wfa	USA, WSHB Cypress Creek SC	7535af				
0600	0700		USA, WTJC Newport NC	9370na				
0600	0700		USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
0600	0700		USA, WYFR Okeechobee FL	7355eu	11530eu			
0600	0700	vl	Vanuatu, Radio	3945al	4960do			
0600	0700		Yemen, Rep of Yemen Radio	9780me				
0600	0700		Zambia, Christian Voice	9865do				
0605	0612		Croatia, Croatian Radio	9470pa				
0630	0700		Austria, Radio Austria Intl	6155eu	13730eu	17870me		
0630	0700		Georgia, Georgian Radio	11805eu				
0630	0700	mtwhf/vl	Italy, IRRS	13840va				
0630	0700		Vatican City, Vatican Radio	11625af	13765af	15570af		
0637	0700		Romania, R Romania Intl	9510eu	9530na	9570eu	9625eu	
			11790eu	11829na	11940eu			

0700 UTC - 2AM E / 1AM C / 11PM P

0700	0705		New Zealand, Radio NZ Intl	15340pa				
0700	0730	mtwhf/vl	Italy, IRRS	13840va				
0700	0730		Slovakia, R Slovakia Intl	13715au	15460au	17550au		
0700	0730		UK, BBC World Service	6005af				
0700	0745		USA, WYFR Okeechobee FL	7355eu				
0700	0756		Romania, R Romania Intl	17720af	21480af			
0700	0800		Anguilla, Caribbean Beacon	6090am				
0700	0800		Australia, ABC NT Alice Springs	4810eu	9960eu			
0700	0800		Australia, ABC NT Katherine	5025do				
0700	0800		Australia, ABC NT Tennant Crk	4910do				
0700	0800		Australia, Radio	7240va	9660pa	11880va	13620as	15320as
			15320as	15420va	15415as	17580pa	17715va	17750as	21725va
			21740va					
0700	0800		Canada, CFRX Toronto ON	6070do				
0700	0800		Canada, CFVP Calgary AB	6030do				
0700	0800		Canada, CKZN St John's NF	6160do				
0700	0800		Canada, CKZU Vancouver BC	6160do				
0700	0800		Costa Rica, R for Peace Intl	7455am	15040am			
0700	0800		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
0700	0800		Ecuador, HCJB	5965eu	11755pa	21455usb		
0700	0800	mtwhf	Eqt Guinea, Radio Africa	15185af				
0700	0800	as/vl	Eqt. Guinea, Radio East Africa	15185af				
0700	0800	mtwhf	France Radio France Intl	15605af				
0700	0800		Germany, Deutsche Welle	6140eu				
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915do			
0700	0800		Guyana, Voice of	3290do	5950do			
0700	0800		Kuwait, Radio	15110as				
0700	0800		Liberia, ELWA	4760do				
0700	0800		Liberia, R Liberia Intl	6100do				
0700	0800		Malaysia, Radio	7295do				
0700	0800		Malaysia, RTM Kota Kinabalu	5979do				
0700	0800		Malaysia, Voice of	6175as	9750as	15295as		
0700	0800		Myanmar, Radio	9730do				
0700	0800		Papua New Guinea, NBC	4890do	9675al			
0700	0800		Russia, University Network	17765as				
0700	0800		Russia, Voice of Russia	11820eu	12010eu	15275au	17665au	
			21790au					
0700	0800		Singapore, SBC Radio One	6150do				
0700	0800	vl	Solomon Islands, SIBC	5020do	9545do			
0700	0800		Taiwan, R Taipei Intl	5950na				
0700	0800		UK, BBC World Service	6190af	6195eu	9410eu	11760va	11765af
			11940af	11955as	12095va	15310as	15360as	15400af	15485va
			15565va	15575va	17640me	17760as	17790as	17885af	21660as
0700	0800		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb	6458usb	10320usb	12579usb	12689usb	13362usb	
0700	0800		USA, KALJ Dallas TX	5755va				
0700	0800		USA, KIMF Otero NM	5835na				
0700	0800		USA, KTBN Salt Lk City UT	7505na				
0700	0800		USA, KWHR Naalehu HI	11565pa	17780as			
0700	0800		USA, WBCQ Kennebunk, ME	7415na				
0700	0800		USA, WEWN Birmingham AL	5825na				
0700	0800		USA, WHRA Greenbush ME	7580va				
0700	0800		USA, WHRI Noblesville IN	5745va	7315am			
0700	0800		USA, WJIE Louisville KY	7490am	13595am			

0700	0800		USA, WMLK Bethel PA	9465eu	9955eu			
0700	0800		USA, WRNO New Orleans LA	7395am				
0700	0800	tf	USA, WSHB Cypress Creek SC	7535af				
0700	0800		USA, WTJC Newport NC	9370na				
0700	0800		USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
0700	0800		USA, WYFR Okeechobee FL	9985af	11580af			
0700	0800	vl	Vanuatu, Radio	3945al	4960do			
0706	0800		New Zealand, Radio NZ Intl	11675pa				
0715	0745	mtwhf	Guam, TWR/KTWR	15215as				
0730	0745	vl/mtwhf	Vatican City, Vatican Radio	4005eu	5980eu	6185eu	7250eu	
			9645af 11740eu	15595as				
0730	0800		Australia, Radio	11695as				
0730	0800	vl	Austria, AWR	17820va				
0730	0800		Bulgaria, Radio	12000eu	13600eu			
0730	0800		Switzerland, Swiss R Intl	9885af	13790af	17665af		
0730	0800	as	UK, BBC World Service	15575va				
0738	0750		Croatia, Croatian Radio	9470pa				
0745	0800	as	Albania, TWR	12070eu				
0745	0800	mtwhf	Guam, TWR/KTWR	15215as	15330as			
0755	0800	mtwhf	Albania, TWR	12070eu				
0755	0800	mtwhf	Monaco, TWR	9870eu				

0800 UTC - 3AM E / 2AM C / 12AM P

0800	0804		Pakistan, Radio	17835eu	21465eu			
0800	0820	s	Monaco, TWR	9870eu				
0800	0825		Belgium, Radio Vlaanderen Intl	5985eu				
0800	0827		Czech Rep, Radio Prague Intl	11600eu	15255eu			
0800	0830		Australia, ABC NT Alice Springs	4810eu	9960eu			
0800	0830		Australia, ABC NT Katherine	5025do				
0800	0830		Australia, ABC NT Tennant Crk	4910do				
0800	0830		Malaysia, RTM Kota Kinabalu	5979do				
0800	0830		Malaysia, Voice of	6175as	9750as	15295as		
0800	0830		Myanmar, Radio	9730do				
0800	0845		USA, WYFR Okeechobee FL	11580af				
0800	0850	as	Albania, TWR	12070eu				
0800	0850	s	Monaco, TWR	9870eu				
0800	0900	mtwhf	Albania, TWR	12070eu				
0800	0900		Anguilla, Caribbean Beacon	6090am				
0800	0900		Australia, Radio	5995pa	7240va	9580va	9660pa	9710pa
			11880va 12080va	15420va	15415as	17715va	17750as	17795va
			21725as 21740va					
0800	0900	vl	Austria, AWR	9660af	17820va			
0800	0900	mtwhf	Bhutan, Bhutan BC Service	5030al	6035do			
0800	0900		Canada, CFRX Toronto ON	6070do				
0800	0900		Canada, CFVP Calgary AB	6030do				
0800	0900		Canada, CKZN St John's NF	6160do				
0800	0900		Canada, CKZU Vancouver BC	6160do				
0800	0900		Costa Rica, R for Peace Intl	7455am	15040am			
0800	0900		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na	17645as				
0800	0900		Ecuador, HCJB	5965eu	11755pa	21455usb		
0800	0900	mtwhf	Eqt Guinea, Radio Africa	15185af				
0800	0900	as/vl	Eqt. Guinea, Radio East Africa	15185af				
0800	0900		Germany, Deutsche Welle	6140eu				
0800	0900	as	Guam, TWR/KTWR	15330as				
0800	0900	mtwhf	Guam, TWR/KTWR	15215as				
0800	0900		Guyana, Voice of	3290do	5950do			
0800	0900		Indonesia, Voice of	9525va				
0800	0900		Liberia, ELWA	4760do				
0800	0900		Liberia, R Liberia Intl	6100do				
0800	0900		Malaysia, Radio	7295do				
0800	0900		New Zealand, Radio NZ Intl	11675pa				
0800	0900		Papua New Guinea, NBC	4890do	9675al			
0800	0900	as	Russia, Bible Voice BC	5975eu				
0800	0900		Russia, University Network	17765as				
0800	0900		Russia, Voice of Russia	11820eu	12010eu	17495au	17525au	
			17665au 17665au					
0800	0900		Singapore, SBC Radio One	6150do				
0800	0900	a	South Africa, Radio League	9750af	21560af			
0800	0900		South Korea, R Korea Intl	9570va	13670va			
0800	0900		UK, BBC World Service	6190af	6195eu	9410eu	11760va	11940af
			11955as 12095va	15310as	15360as	15400af	15485va	15565va
			15575va 17640va	17760as	17830af	17885af	21470af	21660as
			21830as					
0800	0900		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb 6458usb	10320usb	12579usb	12689usb	13362usb	
0800	0900		USA, KALJ Dallas TX	5755va				
0800	0900		USA, KIMF Otero NM	5835na				
0800	0900		USA, KNLS Anchor Point AK	9615as				
0800	0900		USA, KTBN Salt Lk City UT	7505na				
0800	0900		USA, KWHR Naalehu HI	11565pa	17780as			
0800	0900		USA, Voice of America	11955va	13605va	15150va		
0800	0900		USA, WBCQ Kennebunk, ME	7415na				
0800	0900		USA, WEWN Birmingham AL	5825na				
0800	0900		USA, WHRI Noblesville IN	5745va	7315am			
0800	0900		USA, WJIE Louisville KY	7490am	13595am			
0800	0900		USA, WMLK Bethel PA	9465eu	9955eu			
0800	0900		USA, WRMI Miami FL	7385na				
0800	0900		USA, WRNO New Orleans LA	7395am				
0800	0900	as	USA, WSHB Cypress Creek SC	7535eu	9845oc			
0800	0900	tw	USA, WSHB Cypress Creek SC	9845oc				
0800	0900		USA, WTJC Newport NC	9370na				
0800	0900		USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
0800	0900	vl	Vanuatu, Radio	3945al	4960do			
0805	0812		Croatia, Croatian Radio	13820au				
0830	0900		Australia, ABC NT Alice Springs	2310do	4835irr			
0830	0900		Australia, ABC NT Katherine	2485do				
0830	0900		Australia, ABC NT Tennant Crk	2325do				
0830	0900		Georgia, Georgian Radio	11910eu				
0830	0900	vl	Solomon Islands, SIBC	5020do	9545do			
0830	0900		Switzerland, Swiss R Intl	21770af				
0840	0850		Turkmenistan, Turkmen Radio	4930as				

0900 UTC - 4AM E / 3AM C / 1AM P

0900	0915	as	Russia, Bible Voice BC	5975eu				
0900	0920	mtwhf s	Albania, TWR	12070eu				
0900	0920	mtwhf	Monaco, TWR	9870eu				
0900	0930		Austria, AWR	17670af				
0900	0930		Guam, TWR/KTWR	15330as				
0900	0945		Germany, Deutsche Welle	6160oc	9510va	9770as	11785af	
			15410af 17800af	17820va	17845va	17860af	21560af	
0900	0956		China, China Radio Intl	11730pa	15210pa			
0900	1000		Anguilla, Caribbean Beacon	6090am				
0900	1000		Australia, ABC NT Alice Springs	2310do	4835irr			
0900	1000		Australia, ABC NT Katherine	2485do				
0900	1000		Australia, ABC NT Tennant Crk	2325do				
0900	1000		Australia, Radio	11880as	17775as			
0900	1000		Australia, Voice International	13685as				
0900	1000		Canada, CFRX Toronto ON	6070do				
0900	1000		Canada, CFVP Calgary AB	6030do				
0900	1000		Canada, CKZN St John's NF	6160do				
0900	1000		Canada, CKZU Vancouver BC	6160do				
0900	1000		Costa Rica, R for Peace Intl	7455am	15040am			
0900	1000		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na	17645as				
0900	1000		Ecuador, HCJB	11755pa	21455usb			
0900	1000		Germany, Deutsche Welle	6140eu				
0900	1000		Guyana, Voice of	3290do	5950do			
0900	1000	as/vl	Italy, IRRS	13840va				
0900	1000		Liberia, R Liberia Intl	6100do				
0900	1000		Malaysia, Radio	7295do				
0900	1000	vl/s	Malta, VO Mediterranean	9630eu				
0900	1000		New Zealand, Radio NZ Intl	11675pa				
0900	1000		Palau, KHBN/VO Hope	15725as				
0900	1000		Papua New Guinea, NBC	4890do	9675al			
0900	1000		Russia, University Network	17765as				
0900	1000		Russia, Voice of Russia	11820eu	15275au	17495au	17525au	
			17665au					
0900	1000		Singapore, SBC Radio One	6150do				
0900	1000		UK, BBC World Service	6190af	6195va	9605as	9740as	11760va
			11940af 12095eu	15190sa	15310as	15360as	15400af	15485va
			15565va 15575va	17640va	17760as	17830af	17790as	17885af
			21470af 21660as					
0900	1000		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb 6458usb	10320usb	12579usb	12689usb	13362usb	
0900	1000		USA, KALJ Dallas TX	5755va				
0900	1000		USA, KIMF Otero NM	5835na				
0900	1000		USA, KTBN Salt Lk City UT	7505na				
0900	1000		USA, KWHR Naalehu HI	11565pa	17780as			
0900	1000		USA, Voice of America	11955va	13610va	15150va		
0900	1000		USA, WBCQ Kennebunk, ME	7415na				
0900	1000		USA, WEWN Birmingham AL	5825na				
0900	1000		USA, WHRA Greenbush ME	7580va				
0900	1000		USA, WHRI Noblesville IN	5745va	7315am			
0900	1000		USA, WJIE Louisville KY	7490am	13595am			
0900	1000		USA, WRMI Miami FL	7385na				
0900	1000	th	USA, WSHB Cypress Creek SC	7535eu				
0900	1000		USA, WTJC Newport NC	9370na				
0900	1000		USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
0900	1000	vl	Vanuatu, Radio	3945al	4960do			
0910	0930	s	Armenia, Voice of	4810eu	15270as			
0930	1000		Georgia, Georgian Radio	11910me				
0930	1000		Lithuania, R Vilnius	9710eu				
0930	1000		Netherlands, Radio	9790va	12065va	13710as		
0938	0950		Croatia, Croatian Radio	13820au				

Shortwave Guide

1000 UTC - 5AM E / 4AM C / 2AM P

1000	1027		Vietnam, Voice of	9840as	12020au			
1000	1029		Czech Rep, Radio Prague Intl		21745va			
1000	1030		Austria, Radio Austria Intl		6155eu	13790eu		
1000	1030		Guam, AWR/KSDA	11705as	11900as			
1000	1030		Mongolia, Voice of	12085as				
1000	1030		Sri Lanka, SLBC	4940as				
1000	1030		UK, BBC World Service	9605as	15360as	21660as		
1000	1030		UK, RTE Radio	15280au				
1000	1045		USA, KWHR Naalehu HI	11565pa				
1000	1056		China, China Radio Intl	11730pa	15210pa			
1000	1056		North Korea, Voice of	3560as	9335am	9849as	11710am	11735as
1000	1100		Anguilla, Caribbean Beacon		6090am			
1000	1100		Australia, ABC NT Alice Springs		2310do	4835irr		
1000	1100		Australia, ABC NT Katherine		2485do			
1000	1100		Australia, ABC NT Tennant Crk		2325do			
1000	1100		Australia, Radio	9580va	9660pa	11880as	15240as	15415as
				17580pa	17750as	17795va	21725va	21820as
1000	1100		Australia, Voice International		13685as			
1000	1100	as	Bhutan, Bhutan BC Service		5030al	6035do		
1000	1100		Canada, CFRX Toronto ON		6070do			
1000	1100		Canada, CFVP Calgary AB		6030do			
1000	1100		Canada, CKZN St John's NF		6160do			
1000	1100		Canada, CKZU Vancouver BC		6160do			
1000	1100		Costa Rica, R for Peace Intl		7455am	15040am		
1000	1100		Costa Rica, University Network		5030am	6150am	7375am	9725sa
				11870am	13750na	17645as		
1000	1100		Ecuador, HCJB	11755pa	21455usb			
1000	1100		Germany, Deutsche Welle		6140eu			
1000	1100		Guyana, Voice of	3290do	5950do			
1000	1100		India, All India Radio	13710as	15020as	15235as	15260as	
				17510au	17800as	17895au		
1000	1100	as/vl	Italy, IRRS	13840va				
1000	1100		Japan, Radio	9695as	15590as	21755oc		
1000	1100		Liberia, R Liberia Intl	6100do				
1000	1100		Malaysia, Radio	7295do				
1000	1100		Netherlands, Radio	9790va	12065va	13710as		
1000	1100		New Zealand, Radio NZ Intl		11675pa			
1000	1100		Palau, KHBN/VO Hope	15725as				
1000	1100		Papua New Guinea, NBC		4890do	9675al		
1000	1100		Russia, University Network		17765as			
1000	1100		Singapore, SBC Radio One		6150do			
1000	1100		South Africa, Radio Veritas		7240af			
1000	1100		UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
				12095eu	15190sa	15310as	15485va	15565va	15575va	17640va
				17760as	17790as	17885af	21470af			
1000	1100	as	UK, BBC World Service	15400af	17830af			
1000	1100		USA, Armed Forces Network		3903usb	4278usb	4319usb	4993usb
				6350usb	6458usb	10320usb	12579usb	12689usb	13362usb	
1000	1100		USA, KAIJ Dallas TX		5755va			
1000	1100		USA, KIMF Otero NM		5835na			
1000	1100		USA, KTBN Salt Lk City UT		7505na			
1000	1100		USA, KWHR Naalehu HI	9930as				
1000	1100		USA, Voice of America	5745am	5985va	7370am	9590am	11720va
				15250va	15425va	15455va		
1000	1100		USA, WBCQ Kennebunk, ME		7415na			
1000	1100		USA, WEWN Birmingham AL		5825na	15745na		
1000	1100		USA, WHRI Noblesville IN		9495va	9840am		
1000	1100		USA, WJIE Louisville KY	7490am	13595am			
1000	1100		USA, WRMI Miami FL	9955am				
1000	1100		USA, WRNO New Orleans LA		7395am			
1000	1100	mwh	USA, WSHB Cypress Creek SC		6095am	11780am		
1000	1100	tfa	USA, WSHB Cypress Creek SC		11780as			
1000	1100		USA, WTJC Newport NC	9370na				
1000	1100		USA, WWCR Nashville TN		5070na	5935na	7560na	9475na
1000	1100		USA, WYFR Okeechobee FL		5950na			
1000	1100		Vatican City, Vatican Radio		5890eu			
1000	1200	s	USA, WSHB Cypress Creek SC		9455am	11780as		
1030	1045	mtwhf	Ethiopia, Radio	5990do	7110do	9704do		
1030	1100		Guam, AWR/KSDA	11900as				
1030	1100		Iran, VOIRI	15215as	15375as	15480as	21470as	21730as
1030	1100		Netherlands, Radio	5965na	6045eu	9860eu		
1030	1100		Sri Lanka, SLBC	4940as	11835as	15120as	17850as	
1030	1100		UAE, Emirates Radio	13675eu	15370eu	15395eu	21605eu	

1100 UTC - 6AM E / 5AM C / 3AM P

1100	1104		Pakistan, Radio	17835eu	21465eu			
1100	1105		New Zealand, Radio NZ Intl		11675pa			
1100	1120	fa	Kazakhstan, R Almaty	9620eu	11840eu			
1100	1127		Iran, VOIRI	15215as	15375as	15480as	21470as	21730as
1100	1127		Vietnam, Voice of	7285as				
1100	1130	as	Bhutan, Bhutan BC Service		5030al	6035do		
1100	1130		Netherlands, Radio	9790va	12065va	13710as		
1100	1130		UK, BBC World Service	15400af	17790sa			
1100	1145		Germany, Deutsche Welle		15410af	17800af	21530af	21780af
				25700af				
1100	1200		Anguilla, Caribbean Beacon		11775am			
1100	1200		Australia, ABC NT Alice Springs		2310do	4835irr		
1100	1200		Australia, ABC NT Katherine		2485do			
1100	1200		Australia, ABC NT Tennant Crk		2325do			
1100	1200		Australia, Radio	5995pa	6020pa	9475as	9580va	9660pa
				11650va	11880as	12080va	15240va	15415as	17580pa	17750as
				17795va	21725va	21820as		
1100	1200		Australia, Voice International		13685as			
1100	1200		Canada, CFRX Toronto ON		6070do			
1100	1200		Canada, CFVP Calgary AB		6030do			
1100	1200		Canada, CKZN St John's NF		6160do			
1100	1200		Canada, CKZU Vancouver BC		6160do			
1100	1200		Costa Rica, R for Peace Intl		7455am	15040am		
1100	1200		Costa Rica, University Network		5030am	6150am	7375am	9725sa
				11870am	13750na	17645as		
1100	1200		Ecuador, HCJB	12005am	15115am	21455usb		
1100	1200		Germany, Deutsche Welle		6140eu			
1100	1200	as/vl	Italy, IRRS	13840va				
1100	1200		Japan, Radio	6120na	9695as	15590as		
1100	1200		Jordan, Radio	11690eu				
1100	1200		Malaysia, Radio	7295do				
1100	1200		Netherlands, Radio	5965na	6045eu	9860eu		
1100	1200		Papua New Guinea, NBC		4890do	9675al		
1100	1200		Russia, University Network		17765as			
1100	1200		Singapore, R Singapore Intl		6150as	9600as		
1100	1200		Taiwan, R Taipei Intl	7445as	11985as			
1100	1200		UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
				12095eu	15190va	15310as	15485va	15565va	15575va	17640va
				17760as	17790as	17830af	17885af	21470af		
1100	1200		USA, Armed Forces Network		3903usb	4278usb	4319usb	4993usb
				6350usb	6458usb	10320usb	12579usb	12689usb	13362usb	
1100	1200		USA, KAIJ Dallas TX		5755va			
1100	1200		USA, KIMF Otero NM		5835na			
1100	1200		USA, KTBN Salt Lk City UT		7505na			
1100	1200		USA, KWHR Naalehu HI	9930as	11565pa			
1100	1200		USA, Voice of America	5985va	6110va	9760va	11705va	11720va
				15250va	15425va	15455va		
1100	1200		USA, WEWN Birmingham AL		5825na	15745na		
1100	1200		USA, WHRI Noblesville IN		9495va	9840am		
1100	1200		USA, WINB Red Lion PA	13570am				
1100	1200		USA, WJIE Louisville KY	7490am	13595am			
1100	1200		USA, WRMI Miami FL	9955am				
1100	1200		USA, WRNO New Orleans LA		7395am			
1100	1200	tfas	USA, WSHB Cypress Creek SC		6095am			
1100	1200		USA, WTJC Newport NC	9370na				
1100	1200		USA, WWCR Nashville TN		5070na	5935na	7560na	
				15825na				
1100	1200		USA, WYFR Okeechobee FL		5950na	11725sa	11830sa	
1106	1200		New Zealand, Radio NZ Intl		15175pa			
1115	1130		Israel, Kol Israel	15640va	17545va			
1115	1145		Nepal, Radio	3230as	5005as	6100as	7164as	
1120	1140	w	Kazakhstan, R Almaty	9620eu	11840eu			
1130	1145	vl	Libya, Voice of Africa	15435irr	21695irr			
1130	1155		Belgium, Radio Vlaanderen Intl		7390as			
1130	1157		Czech Rep, Radio Prague Intl		11640va	21745va		
1130	1200		South Korea, R Korea Intl		9650na			
1130	1200		Sri Lanka, SLBC	4940as				
1130	1200	a	UK, Wales Radio Intl	17625au				
1130	1200	f	Vatican City, Vatican Radio		5595va	17515va		
1140	1200	t	Kazakhstan, R Almaty	9620eu	11840eu			

1200 UTC - 7AM E / 6AM C / 4AM P

1200	1225		Netherlands, Radio	5965na	6045eu	9860eu		
1200	1230		France Radio France Intl	15540af	25820af			
1200	1230		Uzbekistan, Radio Tashkent		5060as	5975as	6025as	9715as
1200	1245		USA, WYFR Okeechobee FL		5950na			
1200	1256		China, China Radio Intl	9730as	9760pa	11760pa	11855as	11980as
				15415pa				
1200	1256		Romania, R Romania Intl		17790eu			
1200	1259		Canada, Radio Canada Intl		9660as	11730as		
1200	1300		Anguilla, Caribbean Beacon		11775am			
1200	1300		Australia, ABC NT Katherine		2485do			
1200	1300		Australia, ABC NT Tennant Crk		2325do			
1200	1300		Australia, Radio	5995pa	6020pa	9475as	9580va	9660pa
				11650va	11880as	12080va	15415as	15240pa	17580pa	21725va
				21820as				
1200	1300		Australia, Voice International		13685as			
1200	1300		Canada, CBC Northern Service		9625do			

1200	1300		Canada, CFRX Toronto ON	6070do				
1200	1300		Canada, CFVP Calgary AB	6030do				
1200	1300		Canada, CKZN St John's NF	6160do				
1200	1300		Canada, CKZU Vancouver BC	6160do				
1200	1300		China, Voice of Hope	7485as				
1200	1300		Costa Rica, R for Peace Intl	7455am	15040am			
1200	1300		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na 17645as					
1200	1300		Ecuador, HCJB	12005am	15115am	21455usb		
1200	1300		Germany, Deutsche Welle	6140eu				
1200	1300		Germany, Overcomer Ministries	5975eu				
1200	1300	as/vl	Italy, IRRS 13840va					
1200	1300		Jordan, Radio	11690eu				
1200	1300		Malaysia, Radio	7295do				
1200	1300		New Zealand, Radio NZ Intl	15175pa				
1200	1300		Papua New Guinea, NBC	4890do	9675al			
1200	1300		Russia, University Network	17765as				
1200	1300		Russia, Voice of Hope	13590as				
1200	1300		Singapore, R Singapore Intl	6150as	9600as			
1200	1300		Taiwan, R Taipei Intl	7130as	9610au			
1200	1300		UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
			12095eu 15190va 15310as	15485va	15565va	15575va	17640va	
			17760as 17790as	17885af	17830af	21470af		
1200	1300		Ukraine, R Ukraine Intl	11825na	11840na	13590na	17760na	
1200	1300		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb 6458usb	10320usb	12579usb	12689usb	13362usb	
1200	1300		USA, KAIJ Dallas TX	5755va				
1200	1300		USA, KIMF Otero NM	5835na				
1200	1300		USA, KTBN Salt Lk City UT	7505na				
1200	1300		USA, KWHR Naalehu HI	9930as	11565pa			
1200	1300		USA, Voice of America	6110va	9645va	9760va	11705va	11715va
			15250va 15425va	15455va				
1200	1300		USA, WEWN Birmingham AL	5825na	15745na			
1200	1300		USA, WHRI Noblesville IN	9495na	9840am			
1200	1300		USA, WINB Red Lion PA	13570am				
1200	1300		USA, WJIE Louisville KY	7490am	13595am			
1200	1300		USA, WRMI Miami FL	9955am				
1200	1300		USA, WRNO New Orleans LA	7395am				
1200	1300	mwh	USA, WSHB Cypress Creek SC	6095am	9880as			
1200	1300	a	USA, WSHB Cypress Creek SC	9455am	9880as			
1200	1300	tfs	USA, WSHB Cypress Creek SC	9880as				
1200	1300		USA, WTJC Newport NC	9370na				
1200	1300		USA, WWCR Nashville TN	5070na	5935na	7560na		
			15825na					
1200	1300		USA, WYFR Okeechobee FL	11970na	13695na			
1215	1300		Egypt, Radio Cairo	17775as				
1230	1257		Vietnam, Voice of	9840as	12020as			
1230	1300		Australia, Radio	17750as				
1230	1300		Austria, Radio Austria Intl	6155eu	13730eu			
1230	1300		Bangladesh, Bangla Betar	7185as	9550as			
1230	1300		Bulgaria, Radio	12000eu	15700eu			
1230	1300		Sri Lanka, SLBC	4940as	6005as	6075as	9770as	15745as
1230	1300		Sweden, Radio	17505va	18960na			
1230	1300		Thailand, Radio	9810va				
1230	1300		UAE, Gospel For Asia	15170as				
1245	1300	hfa	Seychelles, FEBA Radio	15535me				

1300 UTC - 8AM E / 7AM C / 5AM P

1300	1305		New Zealand, Radio NZ Intl	15175pa				
1300	1310	mtwhfa	Turkmenistan, Turkmen Radio	5015as				
1300	1330		Australia, Radio	11880as				
1300	1330		Egypt, Radio Cairo	17775as				
1300	1330		UAE, AWR	17870as				
1300	1330		UAE, Gospel For Asia	15170as				
1300	1345		USA, WYFR Okeechobee FL	11970na				
1300	1356		China, China Radio Intl	9570na	11760pa	11900pa	11980as	15180as
1300	1356		North Korea, Voice of	4405as	7505eu	9335na	11335eu	
			11710am 13760eu					
1300	1400		Anguilla, Caribbean Beacon	11775am				
1300	1400		Australia, Radio	5995pa	6020pa	9580va	9660pa	11650va
			12080va 15240pa	15415as	17580pa	21725va	21820as	
1300	1400		Australia, Voice International	13690as				
1300	1400		Canada, CBC Northern Service	9625do				
1300	1400		Canada, CFRX Toronto ON	6070do				
1300	1400		Canada, CFVP Calgary AB	6030do				
1300	1400		Canada, CKZN St John's NF	6160do				
1300	1400		Canada, CKZU Vancouver BC	6160do				
1300	1400	mtwhf	Canada, Radio Canada Intl	9515am	13655am	17710am		
1300	1400		China, Voice of Hope	7485as				
1300	1400		Costa Rica, R for Peace Intl	15040am				
1300	1400		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na 17645as					
1300	1400		Ecuador, HCJB	12005am	15115am	21455usb		
1300	1400		Germany, Deutsche Welle	6140eu				
1300	1400		Germany, Overcomer Ministries	13810me				
1300	1400	as/vl	Italy, IRRS 13840va					
1300	1400		Jordan, Radio	11690eu				
1300	1400		Malaysia, Radio	7295do				
1300	1400		Poland, Radio Polonia	6095eu	9525eu			
1300	1400		Russia, University Network	17765as				
1300	1400		Singapore, R Singapore Intl	6150as	9600as			
1300	1400	as	South Africa, Channel Africa	11720af	17725af	21760af		
1300	1400		South Korea, R Korea Intl	9570as	13670as			
1300	1400		UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
			12095eu 15190va	15310as	15420af	15485va	15565va	15575va
			17640va 17760as	17790as	17830af	17885af	21470af	
1300	1400		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb 6458usb	10320usb	12579usb	12689usb	13362usb	
1300	1400		USA, KAIJ Dallas TX	5755va				
1300	1400		USA, KIMF Otero NM	5835na				
1300	1400		USA, KNLS Anchor Point AK	9615as				
1300	1400		USA, KTBN Salt Lk City UT	7505na				
1300	1400		USA, KWHR Naalehu HI	9930as	11565pa			
1300	1400		USA, Voice of America	6160va	9645va	9760va	11705va	15425va
			15480va					
1300	1400		USA, WBCQ Kennebunk, ME	7415na				
1300	1400	mtwhf	USA, WBCQ Kennebunk, ME	17494na				
1300	1400		USA, WEWN Birmingham AL	9955na	15745na			
1300	1400		USA, WHRA Greenbush ME	17560va				
1300	1400		USA, WHRI Noblesville IN	9840am	15105va			
1300	1400		USA, WINB Red Lion PA	13570am				
1300	1400		USA, WJIE Louisville KY	7490am	13595am			
1300	1400		USA, WRMI Miami FL	15725na				
1300	1400		USA, WRNO New Orleans LA	7395am				
1300	1400	mtwhas	USA, WSHB Cypress Creek SC	9430na	7460as			
1300	1400	tf	USA, WSHB Cypress Creek SC	9455am	7460as			
1300	1400	as	USA, WSHB Cypress Creek SC	7460as				
1300	1400		USA, WTJC Newport NC	9370na				
1300	1400		USA, WWCR Nashville TN	5935na	7560na	12160na		
			15685na					
1300	1400		USA, WYFR Okeechobee FL	11740na	11830na	11560as	17510sa	
			17675na					
1306	1400	oac	New Zealand, Radio NZ Intl	6095pa				
1330	1350		UAE, Emirates Radio	13630eu	13675eu	15400eu	21597eu	
1330	1357		Vietnam, Voice of	7145eu	9730eu			
1330	1400		Australia, Radio	11660as	17750as			
1330	1400		Austria, Radio Austria Intl	17855au				
1330	1400		Germany, Voice of Hope	15775as				
1330	1400		Guam, AWR/KSDA	11755as	15660as			
1330	1400		India, All India Radio	9690as	11620as	13710as		
1330	1400		Laos, Lao National Radio	7145as				
1330	1400	mtwhf	Serbia/Montenegro, R Yugoslavia	11835au				
1330	1400		Sweden, Radio	9490va	18960na			
1330	1400		Turkey, Voice of	17690va	17815eu			
1330	1400		UAE, AWR	15385as				
1330	1400		Uzbekistan, Radio Tashkent	5060as	5975as	6025as	9715as	

1400 UTC - 9AM E / 8AM C / 6AM P

1400	1420		Turkey, Voice of	17690va	17815va			
1400	1429		Czech Rep, Radio Prague Intl	21745va				
1400	1430		Ecuador, HCJB	12005am	15115am	21455usb		
1400	1430		Germany, Voice of Hope	15775as				
1400	1430		Thailand, Radio	9530va				
1400	1455	as	South Africa, Channel Africa	11720af	17725af	21760af		
1400	1456		China, China Radio Intl	7405na	9700as	11675pa	11765as	13685af
			15125af 17720na					
1400	1456		Romania, R Romania Intl	15365eu	17790eu			
1400	1500		Anguilla, Caribbean Beacon	11775am				
1400	1500		Australia, Radio	9580va	9660pa	11650va	11660as	12080va
			15240pa 15415as	15515va	17580pa	17750as	21725va	
1400	1500		Australia, Voice International	13690as				
1400	1500		Canada, CBC Northern Service	9625do				
1400	1500		Canada, CFRX Toronto ON	6070do				
1400	1500		Canada, CFVP Calgary AB	6030do				
1400	1500		Canada, CKZN St John's NF	6160do				
1400	1500		Canada, CKZU Vancouver BC	6160do				
1400	1500	mtwhf	Canada, Radio Canada Intl	9515am	13655am	17710am		
1400	1500		Costa Rica, R for Peace Intl	15040am				
1400	1500		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na 17645as					
1400	1500		France Radio France Intl	7175af	9580af	17620af		
1400	1500		Germany, Deutsche Welle	6140eu				
1400	1500		Germany, Overcomer Ministries	13810me				
1400	1500		India, All India Radio	9690as	11620as	13710as		
1400	1500		Japan, Radio	7200as	9505na	9845as	11730as	
1400	1500		Jordan, Radio	11690eu				

1400	1500	ccc	New Zealand, Radio NZ Intl	6095pa				
1400	1500		Oman, Radio	15140eu				
1400	1500		Russia, University Network	17765as				
1400	1500		Singapore, SBC Radio One	6150do				
1400	1500		Taiwan, R Taipei Intl	15265as				
1400	1500		UAE, AWR	15385as				
1400	1500		UK, BBC World Service	6190af	6195va	9740as	11940af	12095va
			15190am	15310as	15485va	15565va	15575va	17640va	17830af
			21470af	21660af				
1400	1500		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb	6458usb	10320usb	12579usb	12689usb	13362usb	
1400	1500		USA, KAIJ Dallas TX	13815va				
1400	1500		USA, KIMF Otero NM	5835na				
1400	1500		USA, KJES Vado NM	11715na				
1400	1500		USA, KTBN Salt Lk City UT	7505na				
1400	1500		USA, KWHR Naalehu HI	9930as				
1400	1500		USA, Voice of America	6110va	7125va	9645va	9760va	11705va
			15205va	15395va	15425va	15480va		
1400	1500		USA, WBCQ Kennebunk, ME	17495na				
1400	1500		USA, WEWN Birmingham AL	9955na	15745na			
1400	1500		USA, WHRA Greenbush ME	17560va				
1400	1500		USA, WHRI Noblesville IN	9840am	15105va			
1400	1500		USA, WINB Red Lion PA	13570am				
1400	1500		USA, WJIE Louisville KY	7490am	13595am			
1400	1500		USA, WRMI Miami FL	15725na				
1400	1500		USA, WRNO New Orleans LA	7395am				
1400	1500		USA, WTJC Newport NC	9370na				
1400	1500		USA, WWCR Nashville TN	9475na	12160na	13845na		
			15685na					
1400	1500		USA, WYFR Okeechobee FL	11740na	11830na	11560as	17510sa	
			17675na	17760na				
1415	1420		Nepal, Radio	3230as	5005as	6100as	7164as	
1430	1450	vl	Vatican City, Vatican Radio	9865as	13765as	15235as		
1430	1500		Australia, Radio	9475as				
1430	1500		Austria, Radio Austria Intl	6155eu	13730eu			
1430	1500		Myanmar, Radio	5040do	5985do			
1430	1500		Netherlands, Radio	9890as	11835as	12075as	15220na	
1430	1500		Sweden, Radio	17505va	18960na			
1445	1500		Guam, TWR/KTWR	15330as				

1500 UTC - 10AM E / 9AM C / 7AM P

1500	1515	whf	Seychelles, FEBA Radio	15445as				
1500	1530		Mexico, Radio Mexico Intl	9705am	11770am			
1500	1530		Mongolia, Voice of	12015eu				
1500	1530		South Africa, Channel Africa	17725af				
1500	1530	as	UK, BBC World Service	11860af	21490af			
1500	1545		Guam, TWR/KTWR	15330as				
1500	1556		China, China Radio Intl	7405as	7160as	9785as	13685af	
			15125na	17720na				
1500	1556		North Korea, Voice of	4405as	7505eu	9335am	11335eu	
			11710am					
1500	1557		Canada, Radio Canada Intl	15360as	17870as			
1500	1559	mtwhf	Canada, Radio Canada Intl	9515am	13655am	17710am		
1500	1600		Anguilla, Caribbean Beacon	11775am				
1500	1600		Australia, Radio	9475as	9580va	9660pa	11650va	11660as
			12080va	15240pa	15415as	15515va	17580pa	17750as	21725va
1500	1600		Australia, Voice International	13690as				
1500	1600		Austria, Radio Afrika Intl	17895eu				
1500	1600		Canada, CBC Northern Service	9625do				
1500	1600		Canada, CFRX Toronto ON	6070do				
1500	1600		Canada, CFVP Calgary AB	6030do				
1500	1600		Canada, CKZN St John's NF	6160do				
1500	1600		Canada, CKZU Vancouver BC	6160do				
1500	1600		Costa Rica, R for Peace Intl	15040am				
1500	1600		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
1500	1600		Germany, Deutsche Welle	6140eu				
1500	1600	a	Germany, Overcomer Ministries	6110eu				
1500	1600		Japan, Radio	7200as	9750as	9845as	11730as	
1500	1600		Jordan, Radio	11690na				
1500	1600		Myanmar, Radio	5040do	5985do			
1500	1600		Netherlands, Radio	9890as	11835as	12075as	15220na	
1500	1600	ccc	New Zealand, Radio NZ Intl	6095pa				
1500	1600		Russia, Voice of Russia	6205as	7315as	7350as	9590as	9875as
			11500as					
1500	1600		Singapore, SBC Radio One	6150do				
1500	1600		UK, BBC World Service	5975as	6190af	6195va	9410va	9740as
			11940af	12095va	15190am	15310as	15400af	15485va	15565va
			17640me	17790as	17830af	21470af	21660af		
1500	1600		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb	6458usb	10320usb	12579usb	12689usb	13362usb	
1500	1600		USA, KAIJ Dallas TX	13815va				
1500	1600		USA, KIMF Otero NM	5835na				
1500	1600		USA, KJES Vado NM	11715na				
1500	1600		USA, KTBN Salt Lk City UT	7505na				
1500	1600		USA, KWHR Naalehu HI	9930as				
1500	1600		USA, Voice of America	7125va	9575va	9645va	15205va	15395va
1500	1600		USA, WBCQ Kennebunk, ME	17495na				
1500	1600		USA, WEWN Birmingham AL	9955na	15745na			
1500	1600		USA, WHRA Greenbush ME	17650va				
1500	1600		USA, WHRI Noblesville IN	9840am	15105va			
1500	1600		USA, WINB Red Lion PA	13570am				
1500	1600		USA, WJIE Louisville KY	7490am	13595am			
1500	1600		USA, WRMI Miami FL	15725na				
1500	1600		USA, WRNO New Orleans LA	7395am				
1500	1600		USA, WTJC Newport NC	9370na				
1500	1600		USA, WWCR Nashville TN	9475na	12160na	13845na		
			15685na					
1500	1600		USA, WYFR Okeechobee FL	6280as	11830na	17760na		
1515	1530	mtwhf	Seychelles, FEBA Radio	11600as				
1530	1545		Bangladesh, Bangla Betar	4882as	15520as			
1530	1545		Seychelles, FEBA Radio	11600as				
1530	1550	as	Vatican City, Vatican Radio	9865va	13765af	15235af		
1530	1600		Germany, Voice of Hope	9860me				
1530	1600		Iran, VOIRI	7115as	7195eu	9610as	11640as	11775as	11835as
1530	1600		USA, Voice of America	6110va	9760va	9795va	11995va	15460va	
1540	1550		Turkmenistan, Turkmen Radio	4930as				
1545	1600	s h	Bangladesh, Bangla Betar	4882as	15520as			
1545	1600	smt hfa	Seychelles, FEBA Radio	11600as				

1600 UTC - 11AM E / 10AM C / 8AM P

1600	1615		Pakistan, Radio	11570me	15070me	15530af	17725af	
1600	1625		Netherlands, Radio	9890as	11835as	12075as	15220na	
1600	1627		Vietnam, Voice of	7145eu	9730eu			
1600	1628	s	Hungary, Radio Budapest	6025eu	11680eu			
1600	1630		Guam, AWR/KSDA	11560as	15495as	17630as		
1600	1630		Mexico, Radio Mexico Intl	9705am	11770am			
1600	1630		South Africa, Channel Africa	9525af				
1600	1630		UAE, Gospel For Asia	9785as				
1600	1630		USA, KWHR Naalehu HI	9930as				
1600	1635		UAE, Emirates Radio	13630eu	13675eu	15400eu	21597eu	
1600	1645		Germany, Deutsche Welle	11695am	13605as	15455af	21840af	
1600	1645		USA, WYFR Okeechobee FL	17790na				
1600	1650	ccc	New Zealand, Radio NZ Intl	6095pa				
1600	1656		China, China Radio Intl	7190af	13650af			
1600	1656		North Korea, Voice of	3560as	9975af	11735af		
1600	1659	as	Canada, Radio Canada Intl	9515am	13655am	17710am		
1600	1700		Algeria, Radio Algiers Intl	11715eu	15160eu			
1600	1700		Anguilla, Caribbean Beacon	11775am				
1600	1700		Australia, Radio	9475as	9580va	9660pa	11650va	11660as
			11880as	12080va	15240pa	15415as	15515va	17580pa	21725va
1600	1700		Australia, Voice International	13690as				
1600	1700		Canada, CBC Northern Service	9625do				
1600	1700		Canada, CFRX Toronto ON	6070do				
1600	1700		Canada, CFVP Calgary AB	6030do				
1600	1700		Canada, CKZN St John's NF	6160do				
1600	1700		Canada, CKZU Vancouver BC	6160do				
1600	1700		Costa Rica, R for Peace Intl	15040am				
1600	1700		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na				
1600	1700		Ethiopia, Radio	5990do	7110af	7165af	9560af	9704af
			11800af					
1600	1700		France Radio France Intl	11615af	11995af	12015af	15605af	17850af
1600	1700		Germany, Deutsche Welle	6140eu	6170as	7225as	9735af	
1600	1700	a	Germany, Overcomer Ministries	6110eu				
1600	1700		Jordan, Radio	11690na				
1600	1700		Russia, Voice of Russia	4940as	4965as	4975as	6005me	7305as
			9590as	9830me				
1600	1700		South Africa, Radio Veritas	3230af				
1600	1700		South Korea, R Korea Intl	5975va	9515va	9870va		
1600	1700		Sri Lanka, SLBC	4940as				
1600	1700		Taiwan, R Taipei Intl	11560as				
1600	1700		UK, BBC World Service	3915as	5975as	6190af	6195va	7160as
			9410va	9510as	9740as	11940af	12095va	15190am	15310as
			15400af	15565va	17640me	17790as	17830af	21470af	21660af
1600	1700		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb	6458usb	10320usb	12579usb	12689usb	13362usb	
1600	1700		USA, KAIJ Dallas TX	13815va				
1600	1700		USA, KIMF Otero NM	5835na				
1600	1700		USA, KJES Vado NM	11715na				
1600	1700		USA, KTBN Salt Lk City UT	15590na				
1600	1700		USA, Voice of America	6035af	6110va	7125va	9575va	9645va
			13600va	13710af	15395va	15205va	15420af	15485af	15445va
			17715af	17895af	17640va				
1600	1700		USA, WBCQ Kennebunk, ME	17495na				
1600	1700		USA, WEWN Birmingham AL	13615na	15745na			

1600	1700		USA, WHRA Greenbush ME	17650va				
1600	1700		USA, WHRI Noblesville IN	13760na	15105va			
1600	1700		USA, WINB Red Lion PA	13570am				
1600	1700		USA, WJIE Louisville KY	7490am	13595am			
1600	1700		USA, WMLK Bethel PA	9465eu				
1600	1700		USA, WRMI Miami FL	15725na				
1600	1700		USA, WRNO New Orleans LA	7395am				
1600	1700		USA, WSHB Cypress Creek SC	18910af				
1600	1700		USA, WTJC Newport NC	9370na				
1600	1700		USA, WWCR Nashville TN 15685na	9475na	12160na	13845na		
1600	1700		USA, WWRB Manchester TN	9320na	12172na			
1600	1700		USA, WYFR Okeechobee FL 21455eu	6280as	11830na	17760na	18980eu	
1600	1700		Zimbabwe, SWR Africa	6145do				
1630	1700		Australia, Radio	17750as				
1630	1700		Austria, AWR	9850af				
1630	1700		Austria, Radio Austria Intl	17865na				
1630	1700		Egypt, Radio Cairo	15255af				
1630	1700		Georgia, Georgian Radio	6180me				
1630	1700	s	Germany, Voice of Hope	9860me				
1630	1700		Guam, AWR/KSDA	11560as	11980as	15495as	17630as	
1630	1700		UAE, AWR	9890as				
1630	1700	as	UK, BBC World Service	15420af	21490af			
1645	1700		Tajikistan, Radio	7245as				
1650	1700	mtwhf	New Zealand, Radio NZ Intl	11980pa				

1700 UTC - 12PM E / 11AM C / 9AM P

1700	1727		Czech Rep, Radio Prague Intl	5930va	17485va			
1700	1730		France Radio France Intl	11615af	11995af	12015af	15605af	17850af
1700	1730		Jordan, Radio	11690na				
1700	1730	w	Moldova, Radio Pridnestrovye	5960eu				
1700	1730	wh a	Russia, Bible Voice BC	7435me				
1700	1730		South Africa, Channel Africa	17870af				
1700	1730		UK, BBC World Service	6005af	9630af	18950eu		
1700	1750	mtwhf	New Zealand, Radio NZ Intl	11980pa				
1700	1756		China, China Radio Intl	7150af	9570af	9695as	11910af	
1700	1756		Romania, R Romania Intl	7155eu	9625eu	9690eu	11940eu	
1700	1800		Anguilla, Caribbean Beacon	11775am				
1700	1800		Australia, Radio 12080va 15240pa 15515va	9475as	9580va	9660pa	9815pa	11880va
				17580pa	21725pa	21820as		
1700	1800		Australia, Voice International	11685as				
1700	1800		Canada, CBC Northern Service	9625do				
1700	1800		Canada, CFRX Toronto ON	6070do				
1700	1800		Canada, CFVP Calgary AB	6030do				
1700	1800		Canada, CKZN St John's NF	6160do				
1700	1800		Canada, CKZU Vancouver BC	6160do				
1700	1800		Costa Rica, R for Peace Intl	15040am				
1700	1800		Costa Rica, University Network 11870am 13750na 17645as	5030am	6150am	7375am	9725sa	
1700	1800		Egypt, Radio Cairo	15255af				
1700	1800		Germany, Deutsche Welle	6140eu				
1700	1800	a	Germany, Overcomer Ministries	6110eu				
1700	1800		Germany, United Methodist Ch	11735va	13820va			
1700	1800	a	Greece, Voice of	9420eu	15725eu	17705na		
1700	1800		Japan, Radio	9505na	11970na	15355af		
1700	1800		Russia, Voice of Russia	9470me	9590as	9830me		
1700	1800		South Africa, Radio Veritas	3230af				
1700	1800		Sri Lanka, SLBC	4940as				
1700	1800		Taiwan, R Taipei Intl	11550as				
1700	1800		UK, BBC World Service 7160as 9410va 9510as 15565va 17640me 17830af	3255af	3915as	5975as	6190af	6195va
				12095va	15310as	15400af	15420af	
				21470af				
1700	1800		USA, Armed Forces Network 6350usb 6458usb	3903usb	4278usb	4319usb	4993usb	
				10320usb	12579usb	12689usb	13362usb	
1700	1800		USA, KAIJ Dallas TX	13815va				
1700	1800		USA, KIMF Otero NM	5835na				
1700	1800		USA, KTBN Salt Lk City UT	15590na				
1700	1800		USA, Voice of America 13710af 15205va 15395va	6040va	6110va	7125va	9645va	9760va
				15240af	15445af	17895af		
1700	1800	mtwhf	USA, Voice of America 12005va 15255va	5990va	6045va	9525va	9795va	11955va
1700	1800		USA, WBCQ Kennebunk, ME	17495na				
1700	1800		USA, WEWN Birmingham AL	13615na				
1700	1800		USA, WHRA Greenbush ME	17650va				
1700	1800		USA, WHRI Noblesville IN	13760na	15105va			
1700	1800		USA, WINB Red Lion PA	13570am				
1700	1800		USA, WJIE Louisville KY	7490am	13595am			
1700	1800		USA, WMLK Bethel PA	9465eu	15265eu			
1700	1800		USA, WRMI Miami FL	15725na				
1700	1800		USA, WRNO New Orleans LA	7395am				
1700	1800	tha	USA, WSHB Cypress Creek SC	15190af				
1700	1800		USA, WTJC Newport NC	9370na				
1700	1800		USA, WWCR Nashville TN 15685na	9475na	12160na	13845na		
1700	1800		USA, WWRB Manchester TN	9320na	12172na			
1700	1800		USA, WYFR Okeechobee FL	18980eu	21455eu			
1700	1800		Zimbabwe, SWR Africa	6145do				
1704	1500	s	Austria, Radio Austria Intl	17865ca				
1715	1730	mtwhf	UK, BBC World Service	15390am				
1715	1730		Vatican City, Vatican Radio 15595eu	4005eu	5890eu	7250eu	9645eu	
1725	1745	vl/mtwhf	UK, United Nations Radio	7170af	15495af	17580eu		
1730	1745		Israel, Kol Israel	11605va	17545va			
1730	1745	vl	Libya, Voice of Africa	15435irr	21695irr			
1730	1745		UK, BBC World Service	3390va	7230va	9525va		
1730	1800		Australia, Radio	17750as				
1730	1800		Guam, AWR/KSDA	9385me				
1730	1800	vl/mtwhfa	Malta, VO Mediterranean	9850eu				
1730	1800		Netherlands, Radio	6020af	7120af	11655af		
1730	1800		Philippines, Radio Pilipinas	11730me	11890me	15190me		
1730	1800	s whfa	Russia, Bible Voice BC	7435me				
1730	1800		Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu		
1730	1800		Swaziland, TWR	3200af	9500af			
1730	1800		Switzerland, Swiss R Intl	9755va	13790af	15555va		
1730	1800		Vatican City, Vatican Radio	13765af	15570af	17515af		
1735	1745	vl/th	Paraguay, Radio Nacional	9739sa				
1745	1800		Bangladesh, Bangla Betar	7185eu	9550eu	15520eu		
1745	1800		India, All India Radio 13605af 15155af 17670af	7410eu	9445af	9950eu	11620eu	11925af
1751	1800		New Zealand, Radio NZ Intl	15265pa				

1800 UTC - 1PM E / 12PM C / 10AM P

1800	1815		Russia, Bible Voice BC	7435me				
1800	1815	as	Russia, Bible Voice BC	5880eu				
1800	1827		Czech Rep, Radio Prague Intl	5930va	7315va			
1800	1827		Vietnam, Voice of	5955eu	7145eu	9730eu		
1800	1830		Azerbaijan, Voice of	6110eu	9155eu			
1800	1830		Egypt, Radio Cairo	15255af				
1800	1830		Germany, Deutsche Welle	3995au				
1800	1830	s	Germnay, Universal Life	11840af				
1800	1830		South Africa, Channel Africa	17870af				
1800	1830		UK, BBC World Service	5975as	9510as	15705as		
1800	1830		UK, RTE Radio	9895me				
1800	1900		Anguilla, Caribbean Beacon	11775am				
1800	1900		Australia, Radio 9710pa 9815pa 11880va 21725pa 21820as	5995pa	6080pa	7240va	9475as	9580va
				12080va	15515va	17750as		
1800	1900		Australia, Voice International	11685as				
1800	1900		Bangladesh, Bangla Betar	7185eu	9550eu	15520eu		
1800	1900		Canada, CBC Northern Service	9625do				
1800	1900		Canada, CFRX Toronto ON	6070do				
1800	1900		Canada, CFVP Calgary AB	6030do				
1800	1900		Canada, CKZN St John's NF	6160do				
1800	1900		Canada, CKZU Vancouver BC	6160do				
1800	1900		Costa Rica, R for Peace Intl	15040am				
1800	1900		Costa Rica, University Network 11870am 13750na 17645as	5030am	6150am	7375am	9725sa	
1800	1900		Germany, Deutsche Welle	6140eu				
1800	1900		Germany, United Methodist Ch	11735va	13820va			
1800	1900		India, All India Radio 13605af 15155af 17670af	7410eu	9445af	9950eu	11620eu	11925af
1800	1900		Kuwait, Radio	11990as				
1800	1900		Liberia, ELWA	4760do				
1800	1900		Liberia, R Liberia Intl	5100do				
1800	1900		Netherlands, Radio	6020af	7120af	11655af		
1800	1900		New Zealand, Radio NZ Intl	15265pa				
1800	1900		Philippines, Radio Pilipinas	11730me	11890me	15190me		
1800	1900		Poland, Radio Polonia	5995eu	7285eu			
1800	1900		Russia, University Network	9890as				
1800	1900		Russia, Voice of Russia 11510af	7290eu	7335af	7340eu	9590as	9830af
1800	1900	as	Russia, Voice of Russia	5950eu	6175eu			
1800	1900	s	South Africa, Radio League	3215af				
1800	1900		South Africa, Radio Veritas	3230af				
1800	1900		Sri Lanka, SLBC	4940as				
1800	1900		Swaziland, TWR	3200af	9500af			
1800	1900		Taiwan, R Taipei Intl	3955eu				
1800	1900		UK, BBC World Service 12095me 15310va	3255af	6190af	6195va	9410va	
				15400af	15420af	15565me	17830af	21470af
1800	1900		USA, Armed Forces Network 6350usb 6458usb	3903usb	4278usb	4319usb	4993usb	
				10320usb	12579usb	12689usb	13362usb	
1800	1900		USA, KAIJ Dallas TX	13815va				
1800	1900		USA, KIMF Otero NM	11885na				
1800	1900		USA, KTBN Salt Lk City UT	15590na				
1800	1900		USA, Voice of America	6035af	6040va	9760va	9885va	11975af

			13710af	15240af	15580af	17895af		
1800	1900		USA, WBCQ Kennebunk, ME			17495na		
1800	1900		USA, WEWN Birmingham AL			13615na		
1800	1900		USA, WHRA Greenbush ME			17650va		
1800	1900		USA, WHRI Noblesville IN			9495va	13760na	
1800	1900		USA, WINB Red Lion PA	13570am				
1800	1900		USA, WJIE Louisville KY	7490am		13595am		
1800	1900		USA, WMLK Bethel PA	9465eu		15265eu		
1800	1900		USA, WRMI Miami FL	15725na				
1800	1900		USA, WRNO New Orleans LA			7395am		
1800	1900	w	USA, WSHB Cypress Creek SC			18910af		
1800	1900		USA, WTJC Newport NC	9370na				
1800	1900		USA, WWCR Nashville TN			9475na	12160na	13845na
			15685na					
1800	1900		USA, WWRB Manchester TN			9320na	12172na	
1800	1900		USA, WYFR Okeechobee FL			18980eu		
1800	1900		Yemen, Rep of Yemen Radio			9780me		
1800	1900		Zimbabwe, SWR Africa	6145do				
1815	1845	as	Russia, Bible Voice BC	7435me				
1815	1900	as	Russia, Bible Voice BC	5880eu				
1830	1855		Belgium, Radio Vlaanderen Intl			7465as	13650eu	13685eu
1830	1900		Bulgaria, Radio	5800eu		7500eu		
1830	1900		Georgia, Georgian Radio			11910eu		
1830	1900		South Africa, AWR	5960af		6095af	11985af	
1830	1900		South Africa, AWR	11985af				
1830	1900	mtwhfa	Sweden, Radio	6065va				
1830	1900	s	Sweden, Radio	5840va				
1830	1900		UK, BBC World Service	6005af		9630af		
1830	1900		UK, RTE Radio	13640na		21630af		
1830	1900	vl/mtwhf	UK, United Nations Radio			9850me	13775af	
1845	1900	s	Russia, Bible Voice BC	7435me				
1845	1900	a	Russia, Bible Voice BC	7435eu				

1900 UTC - 2PM E / 1PM C / 11AM P

1900	1927		Vietnam, Voice of	7145eu		9730eu		
1900	1930		Germany, Deutsche Welle			3995eu		
1900	1930	s	Germany, Universal Life	9470me				
1900	1930	s	Greece, Voice of	7475eu		9420eu	17705na	
1900	1930		Philippines, Radio Pilipinas			11730me	11890me	15190me
1900	1930	f	Russia, Bible Voice BC	9470na				
1900	1930		UK, BBC World Service	13800eu				
1900	1945		Germany, Deutsche Welle			11765af	13780af	15275af 17560af
			17810af 21780af					
1900	1945		India, All India Radio	7410eu		9445af	11620eu	11925af 13605af
			15075af 15155af	17670af				
1900	1945		USA, WYFR Okeechobee FL			15115eu	18930eu	
1900	1956		China, China Radio Intl	9440af		9585af		
1900	1956		North Korea, Voice of	4405as		7505eu	11335eu	
1900	2000		Anguilla, Caribbean Beacon			11775am		
1900	2000	mtwhf	Argentina, RAE	11710eu				
1900	2000		Australia, Radio	6080pa		7240va	9475as	9500as 9580va
			9815pa 11880va	12080va		15240va	21820as	
1900	2000		Australia, Voice International			13770as		
1900	2000	vl	Botswana, Radio	3356do		4820do	7255do	
1900	2000		Canada, CBC Northern Service			9625do		
1900	2000		Canada, CFRX Toronto ON			6070do		
1900	2000		Canada, CFVP Calgary AB			6030do		
1900	2000		Canada, CKZN St John's NF			6160do		
1900	2000		Canada, CKZU Vancouver BC			6160do		
1900	2000		Costa Rica, R for Peace Intl			15040am		
1900	2000		Costa Rica, University Network			5030am	6150am	7375am 9725sa
			11870am 13750na	17645as				
1900	2000	mtwhf	Eqt Guinea, Radio Africa			15185af		
1900	2000	vl	Ghana, Ghana BC Corp			3366do	4915do	
1900	2000		Kuwait, Radio	11990as				
1900	2000		Liberia, ELWA	4760do				
1900	2000		Liberia, R Liberia Intl	5100do				
1900	2000		Malaysia, Radio	7295do				
1900	2000		Namibia, NBC	3270af		3290af		
1900	2000		Netherlands, Radio	6020af		7120af	11655af	
1900	2000		New Zealand, Radio NZ Intl			15265pa		
1900	2000		Nigeria, Radio/Enugu	6025do				
1900	2000		Nigeria, Radio/Ibadan	6050do				
1900	2000		Nigeria, Radio/Kaduna	4770do		6090do	9570do	
1900	2000		Nigeria, Radio/Lagos	3326do		4990al		
1900	2000		Nigeria, Voice of	7255af		15150af		
1900	2000		Papua New Guinea, NBC			4890do	9675al	
1900	2000	a	Russia, Bible Voice BC	5880me				
1900	2000	s	Russia, Bible Voice BC	7435me				
1900	2000		Russia, University Network			9890as		
1900	2000		Russia, Voice of Russia	5950eu		6175eu	6235eu	7290eu 7335af
			7340eu 7360eu	7440af		9875af	11510af	
1900	2000		South Korea, R Korea Intl			5975va	7275va	
1900	2000		Sri Lanka, SLBC	4940as				
1900	2000	a	Sri Lanka, SLBC	6010eu				
1900	2000		Swaziland, TWR	3200af				
1900	2000		Thailand, Radio	9535eu				
1900	2000		Uganda, Radio	4976do		5026do	7196do	
1900	2000		UK, BBC World Service	3255af		6005af	6190af	6195va 9410va
			9630af 12095af	15310va		15400af	17830af	
1900	2000		USA, Armed Forces Network			3903usb	4278usb	4319usb 4993usb
			6350usb 6458usb	10320usb		12579usb	12689usb	13362usb
1900	2000		USA, KAIJ Dallas TX	13815va				
1900	2000		USA, KIMF Otero NM	11885na				
1900	2000		USA, KJES Vado NM	15385au				
1900	2000		USA, KTBN Salt Lk City UT			15590na		
1900	2000		USA, Voice of America	4950af		6035af	7415af	9525va 9690va
			9760va 9785va	11870va		11975af	12015va	13640va 13710af
			15240af 15180va	15580af		17895af		
1900	2000		USA, Voice of America	5965va		9840va	11720va	11970va 15205va
			15410va					
1900	2000		USA, WBCQ Kennebunk, ME			17495na		
1900	2000	s	USA, WBCQ Kennebunk, ME			7415na		
1900	2000	mtwhf	USA, WBCQ Kennebunk, ME			9335na		
1900	2000		USA, WEWN Birmingham AL			13615na		
1900	2000		USA, WHRA Greenbush ME			17650va		
1900	2000		USA, WHRI Noblesville IN			9495va	13760na	
1900	2000		USA, WINB Red Lion PA	13570am				
1900	2000		USA, WJIE Louisville KY	7490am		13595am		
1900	2000		USA, WMLK Bethel PA	9495eu		15265eu		
1900	2000		USA, WRMI Miami FL	15725na				
1900	2000		USA, WRNO New Orleans LA			7395am		
1900	2000	th	USA, WSHB Cypress Creek SC			15665eu	18910af	
1900	2000	mwfa	USA, WSHB Cypress Creek SC			18910af		
1900	2000		USA, WTJC Newport NC	9370na				
1900	2000		USA, WWCR Nashville TN			9475na	12160na	13845na
			15685na					
1900	2000		USA, WWRB Manchester TN			9320na	12172na	
1900	2000		USA, WYFR Okeechobee FL			3230af		
1900	2000	vl	Vanuatu, Radio	3945al		7260do		
1900	2000		Zambia, Christian Voice			4965do		
1930	2000		Austria, Radio Austria Intl			5945eu	6155eu	
1930	2000		Georgia, Georgian Radio			11760eu		
1930	2000		Greece, Voice of	7475eu				
1930	2000	s	Greece, Voice of	9420eu		17705na		
1930	2000		Iran, VOIRI	6110eu		7215eu	7320eu	11695af 15140af
1930	2000		Serbia/Montenegro, R Yugoslavia			6100eu		
1930	2000		Slovakia, R Slovakia Intl	5915eu		6055eu	7345eu	
1930	2000	mtwhf/vl	Solomon Islands, SIBC	5020do		9545do		
1930	2000		Switzerland, Swiss R Intl	9755va		13660va	15485va	17660va
1930	2000		Turkey, Voice of	9890eu				
1935	1955		Italy, RAI Intl	5970eu		9745eu		
1940	1945		Turkmenistan, Turkmen Radio			4930as		
1945	2000	mtwhfa	Albania, Radio Tirana Intl			7210na	9510na	

2000 UTC - 3PM E / 2PM C / 12PM P

2000	2015	s/vl	Solomon Islands, SIBC	5020do		9545do		
2000	2020		Turkey, Voice of	9890eu				
2000	2025		Netherlands, Radio	6020af		7120af	11655af	
2000	2027		Iran, VOIRI	6110eu		7215eu	7320eu	11695af 15140af
2000	2028		Hungary, Radio Budapest			6025eu	7135eu	7175eu
2000	2030		Israel, Kol Israel	6280va		9435af	11605va	15640va
2000	2030		Mongolia, Voice of	12015eu				
2000	2030	mtwhf/vl	Solomon Islands, SIBC	5020do		9545do		
2000	2030		Switzerland, Swiss R Intl	9755va		13660va	15485va	17660va
2000	2030		Vatican City, Vatican Radio			7365af	9660af	11625af
2000	2045		Germany, Deutsche Welle			6180eu		
2000	2045		Iraq, Radio Iraq Intl	9687irrg		11787eu		
2000	2050		New Zealand, Radio NZ Intl			15265pa		
2000	2056		China, China Radio Intl	5965eu		9440eu	9840eu	11640af 11790eu
			13630af					
2000	2100		Algeria, Radio Algiers Intl			11715eu	15160eu	
2000	2100		Anguilla, Caribbean Beacon			11775am		
2000	2100		Australia, Radio	7240va		9475as	9500as	9580va 9815pa
			11880va 12080va	15240va		21820as		
2000	2100		Australia, Voice International			13770as		
2000	2100	vl	Botswana, Radio	3356do		4820do	7255do	
2000	2100		Canada, CBC Northern Service			9625do		
2000	2100		Canada, CFRX Toronto ON			6070do		
2000	2100		Canada, CFVP Calgary AB			6030do		
2000	2100		Canada, CKZN St John's NF			6160do		
2000	2100		Canada, CKZU Vancouver BC			6160do		
2000	2100		Costa Rica, R for Peace Intl			15040am		
2000	2100		Costa Rica, University Network			5030am	6150am	7375am 9725sa
			11870am 13750na	17645as				

2000	2100		Ecuador, HCJB	11895eu				
2000	2100	mtwhf	Eqt Guinea, Radio Africa		15185af			
2000	2100	vl	Ghana, Ghana BC Corp		3366do	4915do		
2000	2100		Guam, AWR/KSDA	7160as	11700as			
2000	2100		Indonesia, Voice of	9525eu				
2000	2100		Kuwait, Radio	11990as				
2000	2100		Liberia, ELWA	4760do				
2000	2100		Liberia, R Liberia Intl	5100do				
2000	2100		Malaysia, Radio	7295do				
2000	2100	smtwha	Malta, VO Mediterranean		7445eu			
2000	2100		Namibia, NBC	3270af	3290af			
2000	2100		Nigeria, Radio/Enugu	6025do				
2000	2100		Nigeria, Radio/Ibadan	6050do				
2000	2100		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2000	2100		Nigeria, Radio/Lagos	3326do	4990al			
2000	2100		Nigeria, Voice of	7255af	15150af			
2000	2100		Russia, University Network		9890as			
2000	2100		Russia, Voice of Russia	5950eu	6175eu	6235eu	7290eu	7340eu
			7390eu 15735am					
2000	2100		Slovakia, AWR	5955as				
2000	2100		South Africa, AWR	15295af				
2000	2100	mtwhf	Spain, R Exterior Espana	9595af	9680eu			
2000	2100		Uganda, Radio	4976do	5026do	7196do		
2000	2100		UK, BBC World Service	3255af	6005af	6190af	6195va	9410va
			9630af 12095af	15400af	17830af			
2000	2100		USA, Armed Forces Network		3903usb	4278usb	4319usb	4993usb
			6350usb 6458usb	10320usb	12579usb	12689usb	13362usb	
2000	2100		USA, KAIJ Dallas TX	13815va				
2000	2100		USA, KIMF Otero NM	11885na				
2000	2100		USA, KTBN Salt Lk City UT		15590na			
2000	2100		USA, Voice of America	6035af	6095va	7415af	9690va	9760va
			11855af 11975af	13710af	15240af	15580af	17885af	17895af
2000	2100	as	USA, Voice of America	4950af				
2000	2100		USA, WBCQ Kennebunk, ME		17495na			
2000	2100	s	USA, WBCQ Kennebunk, ME		7415na			
2000	2100		USA, WEWN Birmingham AL		13615na	17595af		
2000	2100		USA, WHRA Greenbush ME		17650va			
2000	2100		USA, WHRI Noblesville IN		5745va	9495va		
2000	2100		USA, WINB Red Lion PA	13570am				
2000	2100		USA, WJIE Louisville KY	7490am	13595am			
2000	2100		USA, WMLK Bethel PA	9495eu	15265eu			
2000	2100		USA, WRMI Miami FL	15725na				
2000	2100		USA, WRNO New Orleans LA		7395am			
2000	2100		USA, WTJC Newport NC	9370na				
2000	2100		USA, WWCR Nashville TN		9475na	12160na	13845na	
			15685na					
2000	2100		USA, WWRB Manchester TN		9320na	12172na		
2000	2100		USA, WYFR Okeechobee FL		3230af	17525sa		
2000	2100	vl	Vanuatu, Radio	3945al	7260do			
2000	2100		Zambia, Christian Voice	4965do				
2000	2100	mwf	USA, WSHB Cypress Creek SC		15665af			
2005	2100		Syria, Radio Damascus	12085eu	13610eu			
2025	2045		Italy, RAI Intl	6010af	9710af	11880af		
2030	2045	vl	Libya, Voice of Africa	15435irr	21695irr			
2030	2045		Thailand, Radio	9535eu				
2030	2055		Belgium, Radio Vlaanderen Intl		7465eu			
2030	2057		Vietnam, Voice of	7145eu	9730eu			
2030	2100	t	Belarus, Radio Belarus Intl		7105eu	7210eu		
2030	2100		Cuba, Radio Havana	13660usb	13750eu			
2030	2100		Egypt, Radio Cairo	15375af				
2030	2100		Poland, Radio Polonia	7165eu	7265eu			
2030	2100	vl	Solomon Islands, SIBC	5020do	9545do			
2030	2100		Sweden, Radio	6065va	9445va	9490as		
2030	2100		Uzbekistan, Radio Tashkent		5025eu	7105eu	11905eu	
2040	2100	mtwhfa	Armenia, Voice of	4810eu	9960eu			
2045	2100		India, All India Radio	7410eu	9445eu	9575au	9910au	9950eu
			11620va 11715au					
2050	2100		Vatican City, Vatican Radio		4005eu	5890eu	7250eu	
2050	2110	vl/ mv	atican City, Vatican Radio		4005eu	5890eu	7250eu	
2051	2100		New Zealand, Radio NZ Intl		17675pa			

2100 UTC - 4PM E / 3PM C / 1PM P

2100	2115		Egypt, Radio Cairo	15375af				
2100	2127		Czech Rep, Radio Prague Intl		5930va	9430va		
2100	2127		Vietnam, Voice of	7145eu	9730eu			
2100	2130		China, China Radio Intl	5965eu	9840eu	11640af	11790eu	13630af
2100	2130		Cuba, Radio Havana	13660usb	13750eu			
2100	2130		Nigeria, Radio/Ibadan	6050do				
2100	2130		Thailand, Radio	9530va				
2100	2145		Germany, Deutsche Welle		11645af	11890va	15275va	15410va
			17765af					
2100	2156		North Korea, Voice of	4405as	7505eu	11335eu		
2100	2159		Canada, Radio Canada Intl	5850va	5995va	7235va	7425va	
			9770va 9805va	13650va				
2100	2200		Anguilla, Caribbean Beacon		11775am			
2100	2200		Australia, Radio	5995pa	6020pa	7240va	9500as	9580va
			9660pa 11880va	12080va	17715va	21740va	21820as	
2100	2200		Austria, AWR	9660af				
2100	2200	vl	Botswana, Radio	3356do	4820do	7255do		
2100	2200		Canada, CBC Northern Service		9625do			
2100	2200		Canada, CFRX Toronto ON		6070do			
2100	2200		Canada, CFVP Calgary AB		6030do			
2100	2200		Canada, CKZN St John's NF		6160do			
2100	2200		Canada, CKZU Vancouver BC		6160do			
2100	2200		Costa Rica, R for Peace Intl		7455am	15040am		
2100	2200		Costa Rica, University Network		5030am	6150am	7375am	9725sa
			11870am 13750na	17645as				
2100	2200		Ecuador, HCJB	11895eu				
2100	2200	mtwhf	Eqt Guinea, Radio Africa		15185af			
2100	2200	vl	Ghana, Ghana BC Corp		3366do	4915do		
2100	2200		India, All India Radio	7410eu	9445eu	9575au	9910au	9950eu
			11620va 11715au					
2100	2200		Japan, Radio	6035oc	6055oc	6090eu	6180eu	
			11830eu 11850oc	11855af	11920oc	17825na	17860oc	
			21670na					
2100	2200		Liberia, ELWA	4760do				
2100	2200		Liberia, R Liberia Intl	5100do				
2100	2200		Malaysia, Radio	7295do				
2100	2200		Namibia, NBC	3270af	3290af			
2100	2200		Nigeria, Radio/Enugu	6025do				
2100	2200		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2100	2200		Nigeria, Radio/Lagos	3326do	4990al			
2100	2200		Nigeria, Voice of	7255af	15150af			
2100	2200		Papua New Guinea, NBC		4890do	9675al		
2100	2200		Romania, R Romania Intl		5995eu	7105eu	7215eu	9690eu
2100	2200		Russia, University Network		9890as			
2100	2200		Russia, Voice of Russia	5950eu	6175eu	6235eu	7300eu	7340eu
			7390eu 15735am					
2100	2200	vl	Solomon Islands, SIBC	5020do	9545do			
2100	2200		South Korea, R Korea Intl		15575eu			
2100	2200		Sri Lanka, SLBC	4940as				
2100	2200		Syria, Radio Damascus	12085eu	13610eu			
2100	2200		UK, BBC World Service	3255af	3915as	5965as	5975va	6005af
			6110as 6190af	6195va	9410va	12095va	15400af	
			17830af					
2100	2200		USA, Armed Forces Network		3903usb	4278usb	4319usb	
			4993usb 6350usb	6458usb	10320usb	12579usb	12689usb	
			13362usb					
2100	2200		USA, KAIJ Dallas TX	13815va				
2100	2200		USA, KIMF Otero NM	11885na				
2100	2200		USA, KTBN Salt Lk City UT		15590na			
2100	2200		USA, Voice of America	6035af	6040va	6095va	7415af	9595va
			9670va 9760va	11870va	11975af	13710af	15185va	
			15240af 15580af	17735va	17820va	17895af		
2100	2200		USA, WBCQ Kennebunk, ME		7415na	9335na	17495na	
2100	2200	mtwhf	USA, WBCQ Kennebunk, ME		9335na			
2100	2200		USA, WEWN Birmingham AL		13615na	17595na		
2100	2200		USA, WHRA Greenbush ME		17650va			
2100	2200		USA, WHRI Noblesville IN		5745va	9495va		
2100	2200		USA, WINB Red Lion PA	13570am				
2100	2200		USA, WJIE Louisville KY	7490am	13595am			
2100	2200		USA, WMLK Bethel PA	15265eu				
2100	2200		USA, WRMI Miami FL	15725na				
2100	2200		USA, WRNO New Orleans LA		7395am			
2100	2200	mwa	USA, WSHB Cypress Creek SC		11650eu			
2100	2200	f	USA, WSHB Cypress Creek SC		15665af			
2100	2200		USA, WTJC Newport NC	9370na				
2100	2200		USA, WWCR Nashville TN		7465na	9475na	12160na	
			13845na					
2100	2200		USA, WWRB Manchester TN		9320na	12172na		
2100	2200		USA, WYFR Okeechobee FL		15565eu	17575sa	21455eu	
2100	2200	vl	Vanuatu, Radio	3945al	7260do			
2100	2200		Zambia, Christian Voice	4965do				
2115	2200		Egypt, Radio Cairo	9990eu	15375af			
2130	2156		China, China Radio Intl	5965eu	9840eu	13630eu	13640eu	
2130	2200		Australia, ABC NT Alice Springs		2310do	4835irr		
2130	2200		Australia, ABC NT Katherine		5025do			
2130	2200		Australia, ABC NT Tennant Crk		4910do			
2130	2200		Australia, Radio	11660as				
2130	2200	th	Belarus, Radio Belarus Intl		7105eu	7210eu		
2130	2200		Guam, AWR/KSDA	11960as	11980as			
2130	2200		Iran, VOIRI	9780au	11740au			
2130	2200		Turkey, Voice of	9525va				
2130	2200	t f	UK, BBC World Service	11680sa				
2130	2200	f	UK, Wales Radio Intl	7325eu				
2130	2200		Uzbekistan, Radio Tashkent		5025eu	7105eu	11905eu	

2200 UTC - 5PM E / 4PM C / 2PM P

2200	2227		Iran, VOIRI	9780as	11740au			
2200	2228		Hungary, Radio Budapest	3975eu	6025eu	11825af		
2200	2229		Canada, Radio Canada Intl	5850va	6045va	9770va	9805va	
2200	2230		India, All India Radio	7410eu	9445eu	9575au	9910au	9950eu
			11620va	11715au				
2200	2230		Serbia/Montenegro, R Yugoslavia	6100eu				
2200	2230		South Korea, R Korea Intl	3955eu				
2200	2230		Turkey, Voice of	9525va				
2200	2230		USA, Voice of America	6035af	7215va	7415af	9770va	9890va
			11655af	11760va	11975af	13710af	15185va	15290va
			15305va	17735va	17820va			
2200	2245		Egypt, Radio Cairo	9990eu				
2200	2245		USA, WYFR Okeechobee FL	15565af				
2200	2256		China, China Radio Intl	7170eu				
2200	2300		Anguilla, Caribbean Beacon	6090am				
2200	2300		Australia, ABC NT Alice Springs	2310do	4835irr			
2200	2300		Australia, ABC NT Katherine	5025do				
2200	2300		Australia, ABC NT Tennant Crk	4910do				
2200	2300		Australia, Radio	5995pa	6020pa	9580va	11650va	
			11660as	13620as	15230as	17715va	17795va	21740va
2200	2300		Bulgaria, Radio	5800eu	7500eu			
2200	2300		Canada, CBC Northern Service	9625do				
2200	2300		Canada, CFRX Toronto ON	6070do				
2200	2300		Canada, CFVP Calgary AB	6030do				
2200	2300		Canada, CKZN St John's NF	6160do				
2200	2300		Canada, CKZU Vancouver BC	6160do				
2200	2300		Costa Rica, R for Peace Intl	7445am	15040am			
2200	2300		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
2200	2300	mtwhf	Eqt Guinea, Radio Africa	15185af				
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do			
2200	2300		Guyana, Voice of	3290do	5950do			
2200	2300		Liberia, R Liberia Intl	5100do				
2200	2300		Malaysia, Radio	7295do				
2200	2300		Mexico, Radio Mexico Intl	9705am	11770am			
2200	2300		Namibia, NBC	3270af	3290af			
2200	2300		New Zealand, Radio NZ Intl	17675pa				
2200	2300		Nigeria, Radio/Enugu	6025do				
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2200	2300		Nigeria, Radio/Lagos	3326do	4990al			
2200	2300		Nigeria, Voice of	7255af	15150af			
2200	2300		Russia, University Network	9890as				
2200	2300	vl	Solomon Islands, SIBC	5020do	9545do			
2200	2300	as	Spain, R Exterior Espana	9595af	9680eu			
2200	2300		Sri Lanka, SLBC	4940as				
2200	2300		Taiwan, R Taipei Intl	9355eu				
2200	2300		UK, BBC World Service	5965as	5975va	6195va	7105as	
			11685as	12095va	15400af	17830af		
2200	2300		Ukraine, R Ukraine Intl	5905eu	6020eu	7240eu	9560eu	
2200	2300		USA, Armed Forces Network	3903usb	4278usb	4319usb		
			4993usb	6350usb	6458usb	10320usb	12579usb	12689usb
			13362usb					
2200	2300		USA, KAIJ Dallas TX	13815va				
2200	2300		USA, KIMF Otero NM	11885na				
2200	2300		USA, KTBN Salt Lk City UT	15590na				
2200	2300		USA, KWHR Naalehu HI	17510as				
2200	2300		USA, WBCQ Kennebunk, ME	7415na	9335na	17495na		
2200	2300		USA, WEWN Birmingham AL	9975na	17595na			
2200	2300		USA, WHRA Greenbush ME	7580va	17650va			
2200	2300		USA, WHRI Noblesville IN	5745va	9495va			
2200	2300		USA, WINB Red Lion PA	13570am				
2200	2300		USA, WJIE Louisville KY	7490am	13595am			
2200	2300		USA, WRMI Miami FL	15725na				
2200	2300		USA, WRNO New Orleans LA	7395am				
2200	2300	h	USA, WSHB Cypress Creek SC	7510eu				
2200	2300	w	USA, WSHB Cypress Creek SC	15285sa				
2200	2300		USA, WTJC Newport NC	9370na				
2200	2300		USA, WWCR Nashville TN	5070na	7465na	9475na		
			13845na					
2200	2300		USA, WWRB Manchester TN	9320na	12172na			
2200	2300		USA, WYFR Okeechobee FL	11740na				
2200	2300	vl	Vanuatu, Radio	3945al	7260do			
2200	2300		Zambia, Christian Voice	4965do				
2205	2230		Italy, RAI Intl	11895as				
2230	2255		Belgium, Radio Vlaanderen Intl	13700na				
2230	2257		Czech Rep, Radio Prague Intl	7345va	9435va			
2230	2300	mtwhfa	Albania, Radio Tirana Intl	7130eu	9540eu			
2230	2300		Australia, Radio	9475as				
2230	2300		Austria, Radio Austria Intl	5945eu	6155eu			
2230	2300		Cuba, Radio Havana	9550am				
2230	2300		Sweden, Radio	6065va				
2245	2300		India, All India Radio	9705as	9950as	11620as	13605as	

2300 UTC - 6PM E / 5PM C / 3PM P

2300	0000		Anguilla, Caribbean Beacon	6090am				
2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr			
2300	0000		Australia, ABC NT Katherine	5025do				
2300	0000		Australia, ABC NT Tennant Crk	4910do				
2300	0000		Australia, Radio	9475as	9580va	9660pa	11650pa	11660as
			12080va	13620as	15230as	17715va		
2300	0000		Bulgaria, Radio	9400na	11700na			
2300	0000		Canada, CBC Northern Service	9625do				
2300	0000		Canada, CFRX Toronto ON	6070do				
2300	0000		Canada, CFVP Calgary AB	6030do				
2300	0000		Canada, CKZN St John's NF	6160do				
2300	0000		Canada, CKZU Vancouver BC	6160do				
2300	0000		China, China Radio Intl	5990na	13680na			
2300	0000		Costa Rica, R for Peace Intl	7445am	15040am			
2300	0000		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
2300	0000		Egypt, Radio Cairo	9900am				
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do			
2300	0000		Guyana, Voice of	3290do	5950do			
2300	0000		India, All India Radio	9705as	9950as	11620as	13605as	
2300	0000		Liberia, R Liberia Intl	5100do				
2300	0000		Malaysia, Radio	7295do				
2300	0000		Mexico, Radio Mexico Intl	9705am	11770am			
2300	0000		Namibia, NBC	3270af	3290af			
2300	0000		New Zealand, Radio NZ Intl	17675pa				
2300	0000		Romania, R Romania Intl	7195eu	9510na	9570eu		
			11940na					
2300	0000		Russia, University Network	9890as				
2300	0000		Singapore, SBC Radio One	6150do				
2300	0000		Sri Lanka, SLBC	4940as				
2300	0000		UK, BBC World Service	3915as	5965as	5975va	6195va	7105as
			11685as	11945as	11955as	12095va	15280as	
2300	0000		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb	6458usb	10320usb	12579usb	12689usb	13362usb
2300	0000		USA, KAIJ Dallas TX	13815va				
2300	0000		USA, KIMF Otero NM	11885na				
2300	0000		USA, KTBN Salt Lk City UT	15590na				
2300	0000		USA, KWHR Naalehu HI	17510as				
2300	0000		USA, Voice of America	6180va	7215va	7205va	9620va	9770va
			9780va	11735va	11760va	11805va	13640va	15135va	15185va
			15205va	15290va	15135va	17735va	17820va	
2300	0000		USA, WBCQ Kennebunk, ME	7415na	9335na	17495na		
2300	0000		USA, WEWN Birmingham AL	9975na	17595na			
2300	0000		USA, WHRA Greenbush ME	7580eu				
2300	0000		USA, WHRI Noblesville IN	5745va	9495va			
2300	0000		USA, WINB Red Lion PA	12160am				
2300	0000		USA, WJIE Louisville KY	7490am	13595am			
2300	0000		USA, WRMI Miami FL	15725na				
2300	0000		USA, WRMI Miami FL	15725na				
2300	0000		USA, WRNO New Orleans LA	7355am				
2300	0000	w	USA, WSHB Cypress Creek SC	7510af				
2300	0000		USA, WTJC Newport NC	9370na				
2300	0000		USA, WWCR Nashville TN	3210na	5070na	7465na		
			13845na					
2300	0000		USA, WWRB Manchester TN	5050na	5085na	6890na		
2300	0000		USA, WYFR Okeechobee FL	5985sa	11855sa	15170sa	15400sa	
2300	0000	vl	Vanuatu, Radio	3945al	7260do			
2300	0000		Zambia, Christian Voice	4965do				
2300	2329		Canada, Radio Canada Intl	5960am	9590am	11865am		
2300	2330		Cuba, Radio Havana	9550am				
2300	2330		Nigeria, Radio/Enugu	6025do				
2300	2330		Nigeria, Radio/Kaduna	4770do	6090do			
2300	2330		Nigeria, Radio/Lagos	3326do	4990al			
2300	2330	vl	Solomon Islands, SIBC	5020do	9545do			
2300	2345		Germany, Deutsche Welle	9470as	9815as	13690as	21790as	
2300	2345		USA, WYFR Okeechobee FL	11740na				
2300	2350		Turkey, Voice of	6020va	9655va			
2320	2330		Kyrghyz, Kyrghyz Radio	4010as	4795as			
2330	0000		Australia, Radio	11695as	15415as			
2330	0000		Canada, Radio Canada Intl	5960na	9590na			
2330	0000		Lithuania, R Vilnius	9875eu				
2330	0000		Netherlands, Radio	6165na	9845na			
2330	0000		Switzerland, Swiss R Intl	9885sa	11660sa			
2330	0000		UAE, Gospel For Asia	6145as				
2330	0000		UK, BBC World Service	6035as				
2330	2345	vl	Libya, Voice of Africa	15435irr	21695irr			
2330	2356		China, China Radio Intl	5990na	13680na			
2330	2357		Czech Rep, Radio Prague Intl	9745na	21455usb			
2330	2357		Vietnam, Voice of	9840as	12020as			

Notes:

1. The *BBC World Service Americas stream* **[BBCWS(am)]** is on shortwave at these times and on these frequencies: 0900-1000, 1000-1100 (weekends only) and 1100-1700 on 15190; 1000-1400 on 6195; 1100-1130 on 17790; 2100-0300 on 12095; 2100-0500 on 5975; 0000-0300 on 9825; 0100-0400 on 9525; 0400-0600 on 6135.
2. Some **R. New Zealand Int.** programming may be pre-empted from time to time for coverage of live sports events. Consult <www.rnzi.com> for schedule. In addition, New Zealand returns to standard time on March 16. From that date, programming simulcast from National Radio will be heard on RNZI one hour later UTC. These programs carry an asterisk (*) in the listings.

0000 UTC / 7pm E / 4pm P - Page 43 Freqs

SUNDAY

0000	HCJB Ecuador	DX Partyline (Allen Graham hosts a weekly program for DXers and SWLs)
	R. Netherlands	Music 52/15 (Max Ohlenschlager with musical styles from around the globe)
	WBCQ(7415kHz.)	The Real Amateur Radio Show
0001	BBCWS(am)	Play of the Week (classic and contemporary drama for radio)
0005	R. Australia	The Europeans (historical and cultural perspectives on European societies)
	R. Canada Int.	Quirks and Quarks (Bob McDonald with what's new and next in science)
	R. New Zealand Int.	*At the Movies (Simon Morris with reviews and movie news)
0010	R. Japan	Hello from Tokyo (listener letters, music and short features)
0030	HCJB Ecuador	Saludos Amigos (Yvonne Kennedy and Sharon Bulmer host this popular program of international friendship)
	R. Netherlands	Amsterdam Forum (interactive discussion on current affairs and issues)
	R. New Zealand Int.	*Bookmarks (books and book people in NZ)
	WBCQ(7415 kHz.)	Fred Flintstone's Music Show
0035	R. Australia	Ockham's Razor (sharp commentaries on science topics)

MONDAY-FRIDAY

0005	R. New Zealand Int.	*Cadenza (light classical music selections)

MONDAY

0000	BBCWS(am)	World Briefing
	HCJB Ecuador	Musical Mailbag (listener letters, food and the question of the week)
	WBCQ(7415kHz.)	Le Show (Harry Shearer with a tour-de-force variety show)
	R. Netherlands	Dutch Horizons (Bertine Krol chronicles life in Holland)
0005	R. Canada Int.	Global Village (Jowi Taylor fields reports and music from global venues)
0010	R. Australia	Awaye! (Aboriginal social, political, arts and culture program)
	R. Bulgaria	Folk Studio (Bulgarian folk music)
	R. Japan	Weekend Square (various aspects of Japan presented with intervi ews, music and discussions)
0020	BBCWS(am)	Sports Roundup
0030	BBCWS(am)	The World Today (the BBC's agenda-setting flagship global news program)
	R. Bulgaria	Bulgarian Plaza (bimonthly cultural magazine) Walks and Talks (interesting places in Bulgaria, aired bimonthly)
	R. Netherlands	The Sound Fountain (interesting topics approached in an unusual way using sound montage, esoteric conversations, inner musings and atmospheric music)

TUESDAY-SATURDAY

0005	BBCWS(am)	Outlook (topical magazine of people, places and events)
0005	R. Canada Int.	As It Happens (continues from Mon.-Fri. 2330)
0010	R. Bulgaria	Events and Developments (reports, analyses and commentary on Bulgarian and Balkan events)
	HCJB Ecuador	Studio 9 (daily magazine with focused reports on Latin America)
0015	R. Japan	44 Minutes (daily current affairs magazine about Japan and Asia)
0033	VOA News Now	Coast to Coast (daily magazine of life in the USA hosted by Dave Arlington)

TUESDAY

0000	R. Netherlands	The Research File (a magazine emphasizing the relevance of science to all our lives)
0010	R. Australia	The Science Show (Robyn Williams one of the longest running programs on ABC Radio)
0030	R. Netherlands	EuroQuest (a magazine placing Europe in context)
0045	BBCWS(am)	Write On (listeners comment on BBC programs)

WEDNESDAY

0000	R. Netherlands	Music 52/15 [refer to 0000 S]
0010	R. Australia	The National Interest (Terry Lane's round-up of the week's major issues)
0030	R. Netherlands	A Good Life (how development affects societies)
0045	BBCWS(am)	Heart and Soul (how beliefs, values and religion affect individuals)

THURSDAY

0000	R. Netherlands	The Weekly Documentary (award-winning sound essays and in-depth investigations)
	WBCQ(7415kHz)	Off the Hook (discussing computer and information technology issues)
0010	R. Australia	Background Briefing (ABC Radio's award-winning agenda-setting, current affairs radio documentary program)
0030	R. Canada Int.	Dispatches (a Canadian perspective on international news topics)
	R. Netherlands	Dutch Horizons [refer to 0000 M]
0045	BBCWS(am)	Westway (first weekly episode of this continuing drama)

FRIDAY

0000	R. Netherlands	The Sound Fountain [refer to 0030 M]
	WBCQ(7415kHz.)	Goddess Irina 1 Music Show (your guess is as good as mine-ed.)
0010	R. Australia	Hindsight (Australian social history woven from the memories of those who were there)
0030	HCJB Ecuador	The Book and the Spade (the latest discoveries and developments in Biblical archaeology)
	R. Netherlands	The Research File [refer to 0000 T]
0045	BBCWS(am)	What's the Problem? (a panel of experts offers advice to listeners)

SATURDAY

0000	R. Netherlands	A Good Life [refer to 0030 T]
0000	WBCQ(7415kHz)	The Lost Discs Radio Show (spinning obscure oldies)
0005	R. Australia	Feedback (Roger Broadbent answers listener questions, provides regular updates about RA and delves into communications issues)
	R. New Zealand Int.	*Your Money (Bruce Wallace and panel discuss financial trends)
0030	HCJB Ecuador	Music del Ecuador (Jorge Zambrano with Andean musical selections)
	R. Australia	Country Breakfast (Australian rural and regional issues)
	R. Netherlands	The Weekly Documentary [refer to 0000 H]
	R. New Zealand Int.	*The Saturday Comedy Zone
0045	BBCWS(am)	Westway (second weekly episode of this continuing drama)

0100 UTC / 8pm E / 5pm P - Page 43 Freqs

SUNDAY

0100	BBCWS(am)	The World Today [refer to 0030 M]
	WBCQ(7415kHz)	A Different Kind of Oldies Show (a unique mix of oldies music with "Big Steve" Cole)
	HCJB Ecuador	Ham Radio Today (weekly dedicated to the amateur radio hobbyist with John Beck & Graham Bulmer)
0105	Deutsche Welle	Talking Point (European journalists discuss the week's events)
	R. Australia	In Conversation (Robyn Williams talks to scientists and those interested in science)
	R. Netherlands	Europe Unzipped (a 'Ozippy' compilation of news and views from Europe)
0105	R. Prague	Insight Central Europe (regional current affairs magazine produced jointly by R. Prague, R. Austria Int., R. Slovakia, R. Polonia and R. Budapest)
0115	Deutsche Welle	Inside Europe (a weekly magazine exploring the topical issues shaping the continent)
0120	China R. Int.	In the Spotlight (Chinese arts and cultural magazine)
0130	BBCWS(am)	World Business Review (the week in business and the financial markets)
	R. Australia	Oz Sounds (Australian new music releases)
	R. New Zealand Int.	*The Band Programme (brass band music with John Harrison)
0140	R. Habana Cuba	DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)
0145	BBCWS(am)	Letter from America (Alistair Cooke's weekly commentary on life in the USA)

MONDAY-FRIDAY

0105	R. New Zealand Int.	*In Touch with New Zealand (a domestic afternoon variety program hosted by Wayne Mowat; this hour features popular music set to a theme)
0110	R. Australia	Asia-Pacific (current affairs and business report about Asia and the Pacific)

MONDAY

0100	BBCWS(am)	The World Today [refer to 0030 M]
	R. Habana Cuba	Weekly Review (Cuba's perspective on current events)
	WBCQ(7415kHz.)	Radio New York International (Johnny Lightning plays classic rock to 0500)
0105	Deutsche Welle	Religion and Society (religious events and issues around the world)
	R. Netherlands	Wide Angle (a single issue examined in-depth)
0115	Deutsche Welle	Arts on the Air (Breandain O'Shea covers the German cultural scene)
	R. Prague	Readings from Czech Literature
0130	China R. Int.	People in the Know (intervi ews with prominent Chinese who are shaping the nation's future)
	R. Australia	The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
0140	R. Habana Cuba	The Mailbag Show (listener letters)
0150	R. Habana Cuba	Breakthrough (Arnie Coro's weekly science report)

TUESDAY-SATURDAY

0100	R. Netherlands	Newsline (RN's flagship international current affairs program)
0105	Deutsche Welle	Newslink (daily current affairs magazine focused on Europe)

TUESDAY

0105	BBCWS(am)	Meridian-Masterpiece (critical examinations of creative endeavors)
0130	BBCWS(am)	Charlie Gillett (world music)
	China R. Int.	Biz China (business and finance in the Chinese market)
	Deutsche Welle	Insight (a look at major international trends and developments)
	R. Australia	The Law Report (Damien Carrick presents breaking legal stories in Australia and overseas)
0144	VOA News Now	Dateline (an 11-minute weekday documentary that examines a major issue unfolding in America or the world)

WEDNESDAY

0100	WBCQ(7415kHz)	Good Morning Maine
0105	BBCWS(am)	Meridian-Screen (the film arts)
0130	BBCWS(am)	UK Top Twenty (music from the British rock and pop charts)
	Deutsche Welle	Man and Environment (John Hay presents the human element in environmental issues.)
	R. Australia	The Religion Report (Stephen Crittenden examines the way religion and societies interact)
0140	R. Habana Cuba	DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)
0144	VOA News Now	Dateline [refer to 0144 T]

THURSDAY

0105	BBCWS(am)	Meridian-Writing (reports on books, theatre, poetry, journalism, biography, history and anthropology)
0130	BBCWS(am)	Revolver (musicians play their favorites among the new releases)
	Deutsche Welle	Living in Germany (people, places and events in Germany)
	R. Australia	The Media Report (Mick O'Regan takes a critical look at the latest developments in the communications industry)
0144	VOA News Now	Dateline [refer to 0144 T]

FRIDAY

0105	BBCWS(am)	The Music Biz (the global music business examined)
0130	BBCWS(am)	John Peel (innovative and eclectic pop music)
	China R. Int.	Life in China (a weekly magazine focusing on the lives of ordinary people in China)
	Deutsche Welle	Hard to Beat—The World of Sport (weekly report on German and European sport)
	R. Australia	The Sports Factor (Amanda Smith presents reports which debate and celebrate the cultural significance of sport)
0144	VOA News Now	Dateline [refer to 0144 T]

SATURDAY

0100	WBCQ(7415kHz)	Allan Weiner Worldwide (the station manager's show)
0105	BBCWS(am)	Arts in Action (weekly global arts magazine)
	R. Australia	Asia Pacific Weekend Edition (a weekly current events

and business report for and about Asia and the Pacific region)
R. New Zealand Int. *Eureka! (Allan Caukell reports on science in NZ)
0130 BBCWS(am) Jazzmatazz (weekly global jazz magazine)
China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
Deutsche Welle German by Radio (a language lesson)
R. Australia RA Arts (Julie Copeland presents the world of arts and cultural ideas)
R. New Zealand Int. Health Matters (health issues and developments with Louise Wallace)
0133 VOA News Now News Review (VOA correspondents in the field and from VOA language servi ces join Neal Lavon to discuss the week's major events)

0200 UTC / 9pm E / 6pm P - Page 44 Freqs

DAILY
0230 R. Austria Int. Report from Austria (a daily magazine focusing on Austria and central and eastern Europe)

SUNDAY
0200 WBCQ(7415kHz.) Marion's Attic (rare and vintage recordings presented by Marion Webster)
0205 BBCWS(am) Composer of the Month (biography and music of a major Western classical music composer)
R. Australia Margaret Throsby (a guest is interviewed and presents favorite musical pieces)
R. New Zealand Int. *Feature documentary series
0210 R. Canada Int. Business Sense (an in-depth look at Canadian companies in the global economy)
R. Prague Saturday Music (Czech classical, folk, jazz or rock music)
0211 Voice of Russia News and Views (Russian views on news developments)
0215 R. Taipei Int. Great Wall Forum (the China-Taiwan issue from Taipei's perspective)
0230 BBCWS(am) Music Review (personalities, views and issues in international music)
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week of the month)
Sweden Today (George Wood presents the voices of Sweden, the second week of the month)
Spectrum (Bill Schiller covers the Swedish cultural scene, the third week of the month)
Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week of the month)
0232 Voice of Russia Moscow Yesterday and Today (recalling the most interesting events in the history of the city)
0235 R. Austria Int. Network Europe (a weekly magazine on Europe)
R. Canada Int. Canada in the World (Wojtek Gwiazda hosts a weekly magazine examining Canadian policies, priorities and international relations)
R. Habana Cuba The World of Stamps (philatelic matters)

MONDAY-FRIDAY
0205 R. New Zealand Int. In Touch with New Zealand (continues from 0105, this hour includes intervi ews and music)[until 3/14]
0210 R. Australia The World Today (a comprehensive current affairs program with Monica Attard and John Highfield)
0245 R. Taipei Int. Let's Learn Chinese

MONDAY
0200 WBCQ(7415kHz.) Radio New York International (continues from 0100)
0205 BBCWS(am) Wright Around the World (Steve Wright playing musical requests)
R. Budapest Spotlight (a monthly magazine)[1st M]
Europe Unlimited (Hungary's relations with the rest of Europe)[2nd M]
Heading for Hungary (a monthly travelogue)[3rd M]
And the Gatepost (listener letters)[4th M]
0210 R. Canada Int. The Maple Leaf Mailbag (Ian Jones answers listener mail and hosts the fortnightly CIDX Report for dxers)
R. Habana Cuba From Havana (a showcase of contemporary Cuban music and musicians)
0215 R. Prague Readings from Czech Literature
R. Taipei Int. Jade Bells and Bamboo Pipes (Carson Wong introduces selections of traditional Chinese music)
0230 R. Habana Cuba Top Tens (Cuba's most popular music) [1st/3rd wk.]
The Jazz Place (the very best of Cuban jazz)[2nd/4th wk.]
R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagstršm)
Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend of the month but the first)
0232 Voice of Russia Timelines (Estelle Winters' variety show giving insight into life in Moscow through foreign eyes)
0235 R. Austria Int. Insight Central Europe (regional current affairs magazine produced jointly by R. Prague, R. Austria Int., R. Slovakia, R. Polonia and R. Budapest)
R. Canada Int. Spotlight (a magazine touching on all facets of artistic and cultural life in Canada)

TUESDAY-SATURDAY
0210 R. Budapest Hungary Today (daily magazine covering current events in Hungary)
R. Canada Int. Canada Today (daily magazine of intervi ews, correspondents' reports and Canadian views on world and national events)
0211 Voice of Russia Commonwealth Update (comments on domestic developments and major domestic issues)
0230 R. Sweden Sixty Degrees North (reports, intervi ews and analysis on the Nordic region)

TUESDAY
0205 BBCWS(am) Health Matters (reports on the latest medical research)
0230 BBCWS(am) Everywoman (an international magazine for women)
0232 Voice of Russia Folk Box (music drawn from the traditions of the hundreds of nationalities that make up Russia and the CIS)
0235 R. Canada Int. Media Zone (Ian Jones hosts a weekly forum with Canadian journalists discussing topical issues facing Canadians)
0245 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

WEDNESDAY
0205 BBCWS(am) Go Digital (technology journalist Tracey Logan explains the latest in IT)
0230 BBCWS(am) Omnibus (a weekly documentary tackling any topic across the globe)
0232 Voice of Russia The Jazz Show (recordings from the Russian world of jazz)
0235 R. Canada Int. Spotlight [refer to 0235 M]
0245 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

THURSDAY
0205 BBCWS(am) Discovery (in-depth exploration of science and technology topics)
0215 R. Taipei Int. Discover Taiwan (exploring aspects of the island)
0230 BBCWS(am) Sports International (the issues and personalities behind the headlines)
0235 R. Canada Int. The Maple Leaf Mailbag [refer to 0210 M]
0245 R. Sweden Money Matters (a weekly economic report on the Nordic region)

FRIDAY
0205 BBCWS(am) One Planet (the environment, development, agriculture and human impact on the natural world)
0230 BBCWS(am) Documentaries (social, cultural and political features and series)
0235 R. Canada Int. Business Sense [refer to 0210 S]
0245 R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week of the month)
Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week of the month)
Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week of the month)
The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week of the month)

SATURDAY
0200 WBCQ(7415kHz) Tasha Takes Control (upbeat progressive music)
0205 BBCWS(am) Science in Action (Richard Black reports on science and technology)
R. New Zealand Int. The Mix (new music, intervi ews and sessions with rock, dance, hip-hop and pop musicians)
0210 R. Australia Background Briefing [refer to 0010 H]
0230 BBCWS(am) The Giving Game (the growth of international non-governmental organizations—42,000 NGOs today—since WWII)
0235 R. Canada Int. Canada in the World [refer to 0235 S]

0300 UTC / 10pm E / 7pm P - Page 44 Freqs

DAILY
0300 BBCWS(am) World Briefing
0320 BBCWS(am) Sports Roundup

SUNDAY
0300 HCJB Ecuador DX Partyline (Allen Graham hosts a weekly program for DXers and SWLs)
WBCQ(7415kHz) Pocket Calculator (discussing small consumer electronic devices of the past)
0305 R. Australia Feedback [refer to 0005 A]
R. New Zealand Int. *RPM (international documentary series)
0311 Voice of Russia Moscow Mailbag (VOR's top-rated program in which Joe Adamov answers listener questions and talks about the latest rumors and jokes sweeping Moscow)
0315 Deutsche Welle Spectrum (a weekly program looking at developments in the fields of science and technology)
R. Taipei Int. Great Wall Forum [refer to 0215 S]
0320 China R. Int. In the Spotlight (Chinese arts and cultural magazine)
0330 BBCWS(am) Reporting Religion (Trevor Barnes reports on global religious and ethical issues)
HCJB Ecuador Saludos Amigos (Yvonne Kennedy and Sharon Bulmer host this popular international friendship program)
R. Australia All in the Mind (a foray into the mental universe, the mind, the brain and human behavior)
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week of the month)
Sweden Today (George Wood presents the voices of Sweden, the second week of the month)
Spectrum (Bill Schiller covers the Swedish cultural scene, the third week of the month)
Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week of the month)
WWCR(5070kHz) World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
0332 Voice of Russia Songs from Russia (melodies and musical novelties from Russia's past)
0340 R. Habana Cuba DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)

MONDAY-FRIDAY
0300 R. New Zealand Int. Pacific Regional News
0310 HCJB Ecuador Studio 9 (daily magazine with focused reports on Latin America)
0320 R. Australia Pacific Focus (reports on business, health, environment, sport and culture in the Pacific region)
0345 R. Taipei Int. Let's Learn Chinese

MONDAY
0300 HCJB Ecuador Musical Mailbag (listener letters, food and the question of the week)
KWHR(17510kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
R. Habana Cuba Weekly Review (Cuba's perspective on current events)
WBCQ(7415kHz) Radio New York International (continues from 0100)
0305 R. New Zealand Int. *Tagata o te Moana (Anita Purcell presents a weekly Pacific magazine with NZ and regional Pacific news, issues, information and music)
0310 R. Bulgaria Folk Studio (Bulgarian folk music)
0311 Voice of Russia Moscow Mailbag [refer to 0311 S]
0315 Deutsche Welle Arts on the Air [refer to 0115 M]
Radio Taipei Int. Taiwan Economic Journal
0325 R. Bulgaria Bulgarian Plaza (bimonthly cultural magazine)
Walks and Talks (interesting places in Bulgaria, aired bimonthly)
0330 BBCWS(am) Assignment (documentaries that delve behind the headlines)
China R. Int. People in the Know (intervi ews with prominent Chinese who are shaping the nation's future)
R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagstršm)
Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend of the month but the first)
0332 Voice of Russia This is Russia (the cities and regions, culture and the arts, the countryside, religion and people)
0335 R. Budapest Spotlight (a monthly magazine)[1st M]
Europe Unlimited (Hungary's relations with the rest of Europe)[2nd M]
Heading for Hungary (a monthly travelogue)[3rd M]
And the Gatepost (listener letters)[4th M]
0340 R. Australia The Australian Music Show (the latest rock music from the Triple J youth network of the ABC)
R. Habana Cuba The Mailbag Show (listener letters)
0350 R. Habana Cuba Breakthrough (Arnie Coro's weekly science report)

TUESDAY-SATURDAY
0305 Deutsche Welle Newslink (daily current affairs magazine focused on Europe)

Shortwave Guide

0310 R. Bulgaria Events and Developments (reports, analyses and commentary on Bulgarian and Balkan events)
0330 BBCWS(am) World Business Report (a guide through the main business issues of the day)
R. Sweden Sixty Degrees North (reports, intervi ews and analysis on the Nordic region)
0335 R. Budapest Hungary Today (a daily magazine covering current events in Hungary)

TUESDAY
0305 R. New Zealand Int. Top Five and New Releases (the top five singles and new music releases in NZ with Greg Tatere)
0311 Voice of Russia Science and Engineering (reports on the latest developments in science and technology)
0315 Radio Taipei Int. Jade Bells and Bamboo Pipes [refer to 0215 M]
0330 China R. Int. Biz China (business and finance in the Chinese market)
Deutsche Welle Insight (a look at major international trends and developments)
HCJB Ecuador Inspirational Classics (classical music inspired by religious and spiritual themes)
0332 Voice of Russia Kaleidoscope (the latest economic, social and cultural events in Russia and the CIS)
0340 R. Australia Music Deli (Australian performances of folk, acoustic, traditional and world music)
0345 BBCWS(am) Analysis (background to the stories in the news)
R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

WEDNESDAY
0305 R. New Zealand Int. Pacific Report (RNZI correspondent Don Wiseman intervi ews and reports on regional matters)
0311 Voice of Russia Newmarket (news about business in Russia and Russia's involvement in international business)
0330 Deutsche Welle Man and Environment (John Hay presents the human element in environmental issues.)
R. New Zealand Int. Tradewinds (Walter Zweifel with a weekly report on Pacific regional business and economic news)
0340 R. Australia Blacktracker (Mal Honess presents contemporary Aboriginal music)
R. Habana Cuba DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)
0345 BBCWS(am) Analysis (background to the stories in the news)
R. Sweden Close Up (profiles of people in Sweden from all walks of life)

THURSDAY
0305 R. New Zealand Int. RNZI Talk (a fortnightly introduction to the RNZI and National Radio staff, along with RNZI developments, projects and programmes)
Mailbox (a fortnightly program aimed at the serious shortwave listener, with Myra Oh answering letters, Paul Ormandy reporting the latest DX news, and Frequency Manager Adrian Sainsbury answering technical questions)
0311 Voice of Russia Moscow Mailbag [refer to 0311 S]
0315 R. Taipei Int. Taipei Magazine
0330 Deutsche Welle Living in Germany (people, places and events in Germany)
HCJB Ecuador Walkin' in the Sunshine (Ben Cummings with the roots of country music)
R. New Zealand Int. The World in Sport (Dmitri Edwards presents highlights of the world's sporting week with emphasis on NZ and the Pacific)
0332 Voice of Russia Moscow Yesterday and Today [refer to 0232 S]
0340 R. Australia Oz Country Style (country music from Australia)
0345 BBCWS(am) From Our Own Correspondent (the background to international events from BBC correspondents around the world)
R. Sweden Money Matters (a weekly economic report on the Nordic region)

FRIDAY
0305 R. New Zealand Int. Dateline Pacific (the major Pacific stories of the week, with background and reaction from the people making the news,presented by Don Wiseman)
0311 Voice of Russia Science and Engineering [refer to 0311 T]
0315 R. Taipei Int. Taiwan Gourmet
0330 China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
Deutsche Welle Hard to Beat: The World of Sport (weekly report on German and European sport)
HCJB Ecuador The Book and the Spade (the latest discoveries and developments in Biblical archaeology)
R. New Zealand Int. Pacific Correspondent (RNZI's regional correspondents talk to Don Wiseman about political and social issues in their respective Pacific countries)
0332 Voice of Russia Russian by Radio (a language lesson)
0340 R. Australia Jazz Notes (Australian jazz presented by Ivan Lloyd)
0345 BBCWS(am) Analysis (background to the stories in the news)
0345 R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week of the month)
Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week of the month)
Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week of the month)
The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week of the month)

SATURDAY
0305 R. Australia Rural Reporter (ABC's rural reporters present news and stories from rural and regional Australia
R. New Zealand Int. *Home Grown (Liz Barry with a comprehensive range of NZ music, new releases and music industry info)
0311 Voice of Russia Newmarket [refer to 0311 W]
0330 China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
Deutsche Welle German by Radio (a language lesson)
HCJB Ecuador Musica del Ecuador (Jorge Zambrano with Andean musical selections)
R. Australia In Conversation (Robyn Williams talks to scientists and those nterested in the subject about what it's meant to their lives)
R. New Zealand Int. *Musical Chairs (NZ music artist profiles and performances)
0332 Voice of Russia Audio Book Club (readings from the best of Russian classic and contemporary literature)
0345 BBCWS(am) Analysis (background to the stories in the news)

0400 UTC / 11pm E / 8pm P - Page 45 Freqs

SUNDAY
0400 BBCWS(am) The World Today (the BBC's agenda-setting flagship global news program)
RVi Belgium Music from Flanders (a half-hour of Flemish music, musicians and musical performances)
WWCR(5070kHz) Spectrum (talking about radio, computers and communications)
0405 R. Australia Pacific Focus-Arts (reports on culture and the arts in the Pacific region)
0410 R. New Zealand Int. *Sunday Drama (classic and contemporary radio drama from around the world)
R. Prague Saturday Music (Czech classical, folk, jazz or rock music)
0411 Voice of Russia News and Views [refer to 0411 T-A]
0420 China R. Int. In the Spotlight [refer to 0320 S]
0430 BBCWS(am) Global Business (Peter Day charts the transformations sweeping through the world of work and commerce)
KWHR(17780kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
R. Australia RA Arts [refer to 0130 A]
0432 Voice of Russia Kaleidoscope (the latest economic, social and cultural events in Russia and the CIS)
0435 R. Habana Cuba The World of Stamps (This just might be the only program on radio on philatelic matters)
R. Netherlands Europe Unzipped (a Ôzippy'compilation of news and views from Europe)
0440 R. New Zealand Int. *Jazz Spotlight (Haydn Sherley with an artist focus)
0455 R. Netherlands Insight (Rob Green casts a critical and humorous eye on the past week's headlines)

MONDAY-FRIDAY
0400 R. New Zealand Int. *Checkpoint (RNZ National Radio's flagship domestic evening news program)
In Touch with New Zealand (interviews, features and a report from NZ's regions with Wayne Mowat)[from 3/17]
0410 R. Australia Margaret Throsby (a guest is interviewed and presents favorite musical pieces)

MONDAY
0400 BBCWS(am) The World Today [refer to 0400 S]
RVi Belgium Radio World (Frans Vossen presents a weekly report about international radio)
WBCQ(7415kHz) Radio New York International (continues from 0100)
0405 R. Habana Cuba From Havana (a showcase of contemporary Cuban music and musicians)
0415 R. Prague Readings from Czech Literature
0430 BBCWS(am) Westway Omnibus (last week's two episodes of this radio drama serial)
China R. Int. People in the Know [refer to 0330 M]
R. Habana Cuba Top Tens (Cuba's most popular music) [1st/3rd wk.]
The Jazz Place (the very best of Cuban jazz)[2nd/4th wk.]
WHRI(7315kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
0432 Voice of Russia Audio Book Club [refer to 0332 A]
0435 R. Netherlands Sincerely Yours (RN's listener response program.)
0455 R. Netherlands The Week Ahead (a preview of what's on RN the next seven days)

TUESDAY-SATURDAY
0411 Voice of Russia News and Views (Russian views on news developments)
0430 R.Netherlands Newsline (RN's flagship current affairs magazine)
0445 BBCWS(am) Off the Shelf (abridged serialized readings of novels, stories and other literature)

TUESDAY
0405 BBCWS(am) Jazzmatazz (global jazz magazine)
0430 BBCWS(am) Making a Difference (how a development manager improves lives in underdeveloped areas)
China R. Int. Biz China [refer to 0330 T]

WEDNESDAY
0405 BBCWS(am) Charlie Gillett (world music)
0430 BBCWS(am) Write On (listeners comment on BBC programs)

THURSDAY
0405 BBCWS(am) John Peel (innovative and eclectic pop music)
0420 HCJB Ecuador Ham Radio Today
0430 BBCWS(am) Heart and Soul (how beliefs, values and religion affect individuals)

FRIDAY
0405 BBCWS(am) Composer of the Month [refer to 0205 S]
0430 BBCWS(am) Campaigning for Health (Dee Palmer looks at the way health professionals try to give us the info we need)
China R. Int. Life in China [refer to 0330 F]

SATURDAY
0405 BBCWS(am) I'm Sorry I Haven't a Clue (one of Britain's most popular programs makes its debut on the WS)
R. Australia Pacific Focus-Environment (the past week's environmental news as reported on the weekday magazine, Pacific Beat)
R. New Zealand Int. *Home Grown (continued from previous hour)
0430 BBCWS(am) Patterns of Faith (a global exploration of religious values and human wisdom)
China R. Int. Listeners' Garden [refer to 0330 A]
R. Australia The Buzz (the week's big technology news and issues presented by Richard Aedy)

0500 UTC / 12am E / 9pm P - Page 45 Freqs

SUNDAY
0500 R. Netherlands The Amsterdam Forum (interactive discussion on current affairs and issues)
WBCQ(7415kHz) Tom and Darryl (discussions about satellite, shortwave, LPFM and Internet communications)
WWCR(5070kHz) Cyber Line (musings on the new technologies)
0505 BBCWS(am) Wright Around the World [refer to 0205 M]
Deutsche Welle Talking Point (European journalists discuss the week's events.)
R. Australia Pacific Focus-Business (reports on business in the Pacific region)
R. New Zealand Int. *Spiritual Outlook [or] Touchstone (religious discussion and debate)
0510 R. Japan Pop Joins the World (a look at Asia as it is now, presenting the cultures and lifestyles of other Asian countries through their popular music)
0515 Deutsche Welle Money Talks (DW's weekly financial magazine highlighting business in Europe)
0520 China R. Int. In the Spotlight [refer to 0320 S]
0530 R. Australia Fine Music Australia (Australian classical music performances)
0532 Voice of Russia Timelines (Estelle Winters' variety show giving insight into life in Moscow through foreign eyes)
0540 R. Habana Cuba DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)

MONDAY-FRIDAY
0500 BBCWS(am) The World Today [refer to 0400 S]
WBCQ(7415kHz.) Amos 'n Andy (the classic radio comedy from America's radio past)
0507 R. New Zealand Int. *What's Going On? (a daily update on entertainment and the arts in NZ)
0510 R. Australia Pacific Beat (one of RA's primary programs, this daily current events and features magazine focuses in on the Pacific island nations)

0515 R. Japan 44 Minutes (current affairs magazine about Japan and Asia)
0530 R. New Zealand Int. *Worldwatch (the stories behind the international headlines)
0545 R. New Zealand Int. *Storytime (a children's program)

MONDAY
0500 R. Habana Cuba Weekly Review (Cuba's perspective on current events)
R. Netherlands Dutch Horizons (Bertine Krol chronicles life in Holland)
0505 Deutsche Welle Religion and Society (an insight into religious events around the world)
0515 Deutsche Welle Cool (Erica Gingerich and Anke Rasper present DW's youth magazine with reports on the attitudes, music and style of young Europe)
WBCQ World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
0530 China R. Int. People in the Know [refer to 0330 M]
0532 Voice of Russia The Jazz Show (recordings from the Russian world of jazz)
0540 R. Habana Cuba The Mailbag Show (listener letters)
0545 WBCQ Radio D.C.
0550 R. Habana Cuba Breakthrough (Arnie Coro with a report on science)

TUESDAY-SATURDAY
0505 Deutsche Welle Newslink (daily current affairs magazine focused on Europe)

TUESDAY
0500 R. Netherlands The Research File (a magazine emphasizing the relevance of science to all our lives)
0511 Voice of Russia Moscow Mailbag (VOR's top-rated program in which Joe Adamov answers listener questions and talks about the latest rumors and jokes sweeping Moscow)
0530 China R. Int. Biz China [refer to 0330 T]
Deutsche Welle Insight (a look at major international trends and developments)

WEDNESDAY
0500 R. Netherlands Music 52/15 (Max Ohlenschlager presents musical styles from around the globe)
0511 Voice of Russia Science and Engineering (reports on the latest developments in science and technology)
0530 Deutsche Welle Man and Environment (John Hay presents the human element in environmental issues)
0532 Voice of Russia Moscow Yesterday and Today (recalling the most interesting events in the history of the city)
0540 R. Habana Cuba DXers Unlimited (Arnie Coro presents a program for radio enthusiasts.)

THURSDAY
0500 R. Netherlands The Weekly Documentary (RN's award-winning sound essays and in-depth investigations)
0511 Voice of Russia Newmarket (news about business in Russia and Russia's involvement in international business)
0530 Deutsche Welle Living in Germany (people, places and events in Germany)
0532 Voice of Russia Folk Box (music drawn from the traditions of the hundreds of nationalities that make up Russia and the CIS)

FRIDAY
0500 R. Netherlands The Sound Fountain (interesting topics approached in an unusual way using sound montage, esoteric conversations, inner musings and atmospheric music)
0511 Voice of Russia Moscow Mailbag (VOR's top-rated program in which Joe Adamov answers listener questions and talks about the latest rumors and jokes sweeping Moscow)
0530 China R. Int. Life in China [refer to 0330 F]
Deutsche Welle Hard to Beat: The World of Sport (weekly report on German and European sport)
0532 Voice of Russia Audio Book Club (readings from the best of Russian classic and contemporary literature)

SATURDAY
0500 BBCWS(am) The World Today [refer to 0400 S]
R. Netherlands A Good Life (how development affects societies)
WBCQ(7415kHz.) Amos Ôn Andy (the classic radio comedy from America's radio past)
0505 R. Australia Pacific Focus-Sport (the week's sports news as reported on the daily magazine ÔPacific Beat')
R. New Zealand Int. *Tagata o te Moana (Anita Purcell presents a weekly Pacific magazine with NZ and regional Pacific news, issues, information and music)
0510 R. Japan Hello from Tokyo (listener letters, music and short features)
0511 Voice of Russia Science and Engineering [refer to 0511 W]
0515 WBCQ(7415kHz) The Clone Zone (your guess is as good as mine—ed.)
0530 BBCWS(am) World Business Review (the week in global business and finance)
China R. Int. Listeners' Garden [refer to 0330 A]
Deutsche Welle German by Radio (a language lesson)
R. Australia Lingua Franca (a program about language and its social, cultural and historical ramifications)
WHRA(7580kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
0532 Voice of Russia Timelines [refer to 0532 S]
0545 BBCWS(am) Letter from America (Alistair Cooke's weekly essay about life in the USA)
R. Australia Short Story (short pieces from Australian literature)

1100 UTC / 6am E / 3am P - Page 48 Freqs

DAILY
1100 BBCWS(am) World Briefing
1120 BBCWS(am) British News

SUNDAY
1100 R. New Zealand Int. NZ Forces Programme (news, information and entertainment for NZ troops and personnel stationed in East Timor and Papua-New Guinea)
1105 R. Australia Correspondents Report (The ABC's overseas reporters give their interpretation and analysis of the week's major events)
1110 R. Japan Hello from Tokyo (listener letters, music and short features)
1130 R. Australia The Business Report (a weekly round-up of the latest business news and information from Australia and the world presented by Narelle Hooper)
BBCWS(am) Assignment [refer to 0330 M]
1135 R. Netherlands Wide Angle (a weekly in-depth look at a news topic)
1155 R. Netherlands The Week Ahead (a preview of what's on RN the next seven days)

MONDAY-FRIDAY
1105 BBCWS(am) Caribbean Report (the latest news in the Caribbean)
R. Australia Asia-Pacific (Radio Australia's flagship current events and business report for and about Asia and the Pacific region)
1110 BBCWS(am) Sports Caribbean
1115 BBCWS(am) Caribbean Magazine (a current affairs and feature program focusing on life in the region)
R. Japan Asian Top News (the day's major stories as reported by the region's radio stations)
1130 BBCWS(am) World Business Report (the main business issues of the day)
HCJB Ecuador Morning in the Mountains (the longstanding breakfast program from The Voice of the Andes with news, sports, prayer, friendly conversation and inspirational music)
R. Australia Bush Telegraph (a daily magazine highlighting regional and rural issues)
R. Netherlands Newsline (RN's flagship current affairs magazine)

MONDAY
1105 R. New Zealand Int. Nine to Noon (current affairs and topics of interest to New Zealanders)
1125 R. Japan Japan Music Log (songs rooted in the lifestyles of each region of Japan, introducing the local traditions, history and culture)
1145 BBCWS(am) Sports Round-up (all the daily sporting news worldwide)

TUESDAY
1105 R. New Zealand Int. Nine to Noon (current affairs and topics of interest to New Zealanders)
1125 R. Japan Let's Learn Japanese (a Japanese language lesson for beginners)
1145 BBCWS(am) Sports Round-up (all the daily sporting news worldwide)

WEDNESDAY
1105 R. New Zealand Int. Nine to Noon (current affairs and topics of interest to New Zealanders)
1125 R. Japan Japanese Musical Treasure Box
1145 BBCWS(am) Sports Round-up (all the daily sporting news worldwide)

THURSDAY
1105 R. New Zealand Int. Nine to Noon (current affairs and topics of interest to New Zealanders)
1125 R. Japan Brush Up Your Japanese (an intermediate course in Japanese)
1145 BBCWS(am) Sports Round-up (all the daily sporting news worldwide)

FRIDAY
1105 R. New Zealand Int. Sports Story (sports anthology program)
1125 R. Japan Music Beat (contemporary Japanese popular music)
1135 R. New Zealand Int. Top 5 (the top selling music in NZ)
1145 BBCWS(am) Football Extra (global soccer news, reviews and interviews)

SATURDAY
1100 R. New Zealand Int. NZ Forces Programme [refer to 1100 S]
1105 R. Australia Asia Pacific Weekend Edition (a weekly current events and business report for and about Asia and the Pacific region)
1110 R. Japan Pop Joins the World (a look at Asia as it is now, presenting the cultures and lifestyles of other Asian countries through their popular music)
1130 BBCWS(am) Analysis (background to a story in the news)
R. Australia Fine Music Australia (Australian classical artists with Charles Southwood)
WRMI(9955kHz) Wavescan (a weekly program from Adventist World Radio for DXers and shortwave radio enthusiasts)
1135 R. Netherlands Europe Unzipped (a Ôzippy' compilation of news and views from Europe)
1145 BBCWS(am) Sports Round-up (all the daily sporting news worldwide)
1155 R. Netherlands Insight (Rob Green casts a critical and humorous eye on the past week's headlines)

1200 UTC / 7am E / 4am P - Page 48 Freqs

DAILY
1200 BBCWS(am) Newshour (60 minutes of news and analysis from around the globe)

SUNDAY
1200 R. Netherlands The Sound Fountain (interesting topics approached in an unusual way using sound montage, esoteric conversations, inner musings and atmospheric music)
1205 R. Australia Nocturne (Mairi Nicolson presents an artfully arranged selection of music from around the globe and across the centuries)
R. New Zealand Int. Sportsworld (excerpts and summaries of the weekend's sporting events)
1230 R. Netherlands Dutch Horizons (Bertine Krol chronicles life in Holland)
R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagström)
Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend of the month but the first)

MONDAY-FRIDAY
1200 HCJB Ecuador Latin American and International News
R. New Zealand Int. Late Edition (RNZ National Radio's domestic late evening news magazine)
1205 BBCWS(am) Caribbean Business (a report on regional commerce and economics)
HCJB Ecuador Sports Report
1210 BBCWS(am) Caribbean Report (the latest news in the Caribbean)
HCJB Ecuador Morning in the Mountains (continues from 1130)
1230 HCJB Ecuador Latin American and International News
R. Sweden Sixty Degrees North (reports, interviews and analysis on the Nordic region)
1235 HCJB Ecuador Morning in the Mountains (continues from 1130)

MONDAY
1200 R. Netherlands EuroQuest (a magazine placing Europe in context)
1205 R. Australia Late Night Live (Philip Adams interviews the major newsmakers, philosophers, artists and trendsetters in Australia and around the world)
1230 R. Netherlands The Research File (a magazine emphasizing the relevance of science to all our lives)
1245 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1200 R. Netherlands A Good Life (how development affects societies)
1205 R. Australia Late Night Live [refer to 1205 M]
1230 R. Netherlands Music 52-15 (Max Ohlenschlager presents musical styles from around the globe)
1245 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

WEDNESDAY
1200 R. Netherlands Dutch Horizons [refer to 1230 S]
1205 R. Australia Late Night Live [refer to 1205 M]
1230 R. Netherlands The Weekly Documentary (RN's award-winning sound essays and in-depth investigations)
1245 R. Sweden Money Matters (a weekly economic report on the Nordic region)

THURSDAY
1200 R. Netherlands The Research File [refer to 1230 M]
1205 R. Australia Late Night Live [refer to 1205 M]
1230 R. Netherlands The Sound Fountain [refer to 1200 S]
1245 R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week of the month)
Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week of the month)
Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week of the month)
The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week of the month)

FRIDAY
1200 R. Netherlands The Weekly Documentary [refer to 1230 W]
1205 R. Australia Sound Quality (Tim Ritchie seeks out the interesting, the evolutionary, the inaccessible and the wonderful in music)
1230 R. Netherlands A Good Life (how development affects societies)
1245 R. Sweden A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1200 R. Netherlands The Amsterdam Forum (interactive discussion on current affairs and issues)
R. New Zealand Int. NZ Forces Programme (continues from 1100)
1205 R. Australia The Spirit of Things (Dr. Rachael Kohn explores contemporary values and beliefs as expressed through ritual, art, music, and sacred texts)
WWCR(5070kHz) Rock the Universe (Christian rock music)
1230 R. Netherlands Music 52-15 [refer to 1230 T]
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week of the month)
Sweden Today (George Wood presents the voices of Sweden, the second week of the month)
Spectrum (Bill Schiller covers the Swedish cultural scene, the third week of the month)
Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week of the month)

1300 UTC / 8am E / 5am P - Page 49 Freqs

SUNDAY
1305 BBCWS(am) Composer of the Month [refer to 0205 S]
R. Australia Nocturne (continues from 1205)
R. Netherlands Sincerely Yours (RN's listener response program)
WWCR(12160kHz) Rock the Universe (Christian rock music)
1320 China R. Int. In the Spotlight (Chinese arts and cultural magazine)
1330 BBCWS(am) In Praise of God (diverse servi ces of worship)
R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagstršm)
Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend of the month but the first)

MONDAY-FRIDAY
1300 R. Australia RA News (a fifteen minute report with emphasis on significant events in Asia and the Pacific region, and sports and business reports)
R. Netherlands Newsline (RN's flagship current affairs magazine)
1305 BBCWS(am) Outlook (topical magazine of people, places and events)
1310 R. Canada Int. The Current (Anna Maria Tremonti hosts a new CBC domestic daily current affairs magazine)[joined in progress]
1320 R. Australia The Planet (Lucky Oceans with a rich mix of jazz, blues, folk styles, art music and more in a show artfully arranged for radio)
1330 R. Sweden Sixty Degrees North (reports, intervi ews and analysis on the Nordic region)
1345 BBCWS(am) Off the Shelf (abridged serialized readings of novels, stories and other literature)

MONDAY
1330 China R. Int. People in the Know (intervi ews with prominent Chinese who are shaping the nation's future)
1345 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1330 China R. Int. Biz China (business and finance in the Chinese market)
WWCR(15825kHz) Musical Memories
1345 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

WEDNESDAY
1345 R. Sweden Money Matters (a weekly economic report on the Nordic region)

THURSDAY
1345 R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week of the month)
Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week of the month)
Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week of the month)
The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week of the month)

FRIDAY
1330 China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
1345 R. Sweden A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1300 WHRI(6040kHz.) DXing with Cumbre (Marie Lamb with the hottest DX catches)
1305 BBCWS(am) World Football (intervi ews, features, reports for global soccer fans)
R. Australia The Science Show (Robyn Williams presents one of the longest running programs on ABC Radio)
R. Netherlands Europe Unzipped [refer to 1135 A]
1330 BBCWS(am) The Music Feature (documentary series on current popular music genres)
China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week of the month)
Sweden Today (George Wood presents the voices of Sweden, the second week of the month)
Spectrum (Bill Schiller covers the Swedish cultural scene, the third week of the month)
Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week of the month)
WHRI(9495kHz.) DXing with Cumbre (Marie Lamb with the hottest DX catches)

1400 UTC / 9am E / 6am P - Page 49 Freqs

DAILY
1400 R. Japan News (a round-up of Asian and world news)

SUNDAY
1400 WRMI(15725kHz) Wavescan (a weekly program from Adventist World Radio for DXers and shortwave radio enthusiasts)
1405 BBCWS(am) Talking Point (global phone-in where listeners and internet users can share their views on the issues of the day and put questions to expert guests)
R. Australia Books and Writing (Ramona Koval conducts in-depth discussions focusing on books, ideas and writing)
1410 R. Canada Int. The Sunday Edition (a relaxed and reflective weekend current affairs, arts and ideas magazine hosted by Michael Enright)
R. Japan Pop Joins the World (a look at Asia as it is now, presenting the cultures and lifestyles of other Asian countries through their popular music)
1415 R. Prague Readings from Czech Literature
1420 China R. Int. In the Spotlight [refer to 1320 S]
1430 R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagstršm)
Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend of the month but the first)
WWCR(15825kHz) The Old Record Shop (vintage recordings)
1435 R. Netherlands Sincerely Yours (RN's listener response program)
1455 R. Netherlands The Week Ahead (on RN the next seven days)

MONDAY-FRIDAY
1400 WWCR(15825kHz) World Wide Country Radio (country music)
1405 R. Australia Margaret Throsby (a guest is interviewed and presents favorite musical pieces)
R. Canada Int. Sounds Like Canada (Shelagh Rogers hosts a lively mix of voices and soung from all over the country)
1415 R. Japan 44 Minutes (current affairs magazine about Japan and Asia)
1430 R.Netherlands Newsline (RN's flagship current affairs magazine)
R. Sweden Sixty Degrees North (reports, intervi ews and analysis on the Nordic region)

MONDAY
1405 BBCWS(am) Meridian-Masterpiece (critical examinations of creative endeavors)
1430 BBCWS(am) Charlie Gillett (world music)
China R. Int. People in the Know [refer to 1330 M]
1445 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1405 BBCWS(am) Meridian-Screen (intervi ews, documentaries, features and discussions on the film arts)
1430 BBCWS(am) The UK Top Twenty (music from the British rock and pop charts)
China R. Int. Biz China [refer to 1330 T]
1445 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

WEDNESDAY
1405 BBCWS(am) Meridian-Writing (reports on books, theatre, poetry, journalism, biography, history and anthopology)
1430 BBCWS(am) Revolver (musicians play their favorites among the new releases)
1445 R. Sweden Money Matters (a weekly economic report on the Nordic region)

THURSDAY
1405 BBCWS(am) The Music Biz (the global music business examined)
1430 BBCWS(am) John Peel (innovative and eclectic pop music)
1445 R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week of the month)
Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week of the month)
Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week of the month)
The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week of the month)

FRIDAY
1405 BBCWS(am) Arts in Action (a global arts magazine)
1430 BBCWS(am) Jazzmotazz (global jazz magazine)
China R. Int. Life in China [refer to 1330 F]
1445 R. Sweden A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1405 BBCWS(am) Sportsworld (live commentary on major sports events and fixtures, reports and results from around Britain and Europe, and news of all the day's sporting action from around the world)
R. Australia New Dimensions (intimate conversations with many of this century's leading thinkers and social innovators)
R. Prague Insight Central Europe (regional current affairs produced jointly by R. Prague, R. Austria Int., R. Slovakia Int., R. Polonia and R. Budapest)
1410 R. Canada Int. The House (a review of the week in Canadian national politics)
R. Japan Weekend Square (a program designed to present various aspects of Japan in a friendly and relaxed atmosphere with intervi ews, music and discussions)
1430 China R. Int. Listeners' Garden [refer to 1330 A]
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week of the month)
Sweden Today (George Wood presents the voices of Sweden, the second week of the month)
Spectrum (Bill Schiller covers the Swedish cultural scene, the third week of the month)
Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week of the month)
1435 R. Netherlands Europe Unzipped (a Ôzippy' compilation of news and views from Europe)
1455 R. Netherlands Insight (Rob Green casts a critical and humorous eye on the past week's headlines)

Shortwave Guide

1500 UTC / 10am E / 7am P - Page 50 Freqs

SUNDAY

1500	R. Netherlands	Dutch Horizons (Bertine Krol chronicles life in Holland)
1505	BBCWS(am)	From Our Own Correspondent (the background to international events from BBC correspondents around the world)
	R. Australia	Encounter (a series exploring the religious experience of multicultural Australia)
1505	R. Canada Int.	The Sunday Edition (continues from 1410)
1520	China R. Int.	In the Spotlight [refer to 1320 S]
1530	BBCWS(am)	People and Politics (inside British politics)
	R. Netherlands	The Sound Fountain (interesting topics approached in an unusual way using sound montage, esoteric conversations, inner musings and atmospheric music)

MONDAY-FRIDAY

1505	R. Australia	Asia Pacific (Radio Australia's flagship current events and business report for and about Asia and the Pacific region)

MONDAY

1500	R. Netherlands	The Research File (a magazine emphasizing the relevance of science to all our lives)
1505	BBCWS(am)	One Planet (stories about the environment, development, agriculture and human impact on the natural world)
	R. Canada Int.	Workology (Jane Farrow looks at the secret world of work—the how, where and why we scratch out a living)
1530	BBCWS(am)	Documentaries (social, cultural and political features and series)
	China R. Int.	People in the Know [refer to 1330 M]
	R. Australia	The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
	R. Netherlands	EuroQuest (a magazine placing Europe in context)

TUESDAY

1500	R. Netherlands	Music 52-15 (Max Ohlenschlager presents musical styles from around the globe)
1505	BBCWS(am)	Science in Action (Richard Black reports on science and technology)
	R. Canada Int.	Out Front (a place for new ideas, new ways of making radio and new voices from across Canada)
1520	R. Canada Int.	Sounds Like Canada (continues from 1405)
1530	BBCWS(am)	The Giving Game (the growth of international non-governmental organizations—42,000 NGOs today—since WWII)
	China R. Int.	Biz China [refer to 1330 T]
	R. Australia	The Law Report (Damien Carrick presents breaking legal stories in Australia and overseas.)
	R. Netherlands	A Good Life (how development affects societies)

WEDNESDAY

1500	R. Netherlands	The Weekly Documentary (RN's award-winning sound essays and in-depth investigations)
1505	BBCWS(am)	Health Matters (reports on the latest medical research)
	R. Canada Int.	Out Front [refer to 1505 T]
1520	R. Canada Int.	Sounds Like Canada (continues from 1405)
1530	R. Australia	The Religion Report (Stephen Crittenden examines the way religion and societies interact)
1530	BBCWS(am)	Everywoman (an international magazine for women)
	R. Netherlands	Dutch Horizons [refer to 1500 S]
	R. Canada Int.	C'est La Vie (Bernard St.-Laurent presents a program about life in Quebec and French-speaking Canada)

THURSDAY

1500	R. Netherlands	The Sound Fountain [refer to 1530 S]
1505	BBCWS(am)	Go Digital (technology journalist Tracey Logan explains the latest in IT)
	R. Canada Int.	Out Front [refer to 1505 T]
1520	R. Canada Int.	Sounds Like Canada (continues from 1405)
1530	BBCWS(am)	Focus on Faith (Trevor Barnes looks at the religious stories behind the news)
	R. Australia	The Media Report (Mick O'Regan takes a critical look at the latest developments in the communications industry)
	R. Netherlands	The Research File [refer to 1500 M]

FRIDAY

1500	R. Netherlands	A Good Life [refer to 1530 T]
1505	BBCWS(am)	Discovery (in-depth exploration of science and technology topics)
	R. Canada Int.	Out Front [refer to 1505 T]
1520	R. Canada Int.	Sounds Like Canada (continues from 1405)
1530	BBCWS(am)	Sports International (the issues and personalities behind the headlines)
	China R. Int.	Life in China [refer to 1330 F]
	R. Australia	The Sports Factor (Amanda Smith presents reports which debate and celebrate the cultural significance of sport)
	R. Netherlands	The Weekly Documentary [refer to 1500 W]

SATURDAY

1500	R. Netherlands	Music 52-15 [refer to 1500 T]
1505	BBCWS(am)	Sportsworld (continues from 1405)
	R. Australia	Nocturne [refer to 1205 S]
	R. Canada Int.	The Vinyl Cafe (Canadian humorist Stuart McLean with music and tales centered around a mythical record store)
1530	China R. Int.	Listeners' Garden [refer to 1330 A]
	R. Netherlands	Amsterdam Forum (interactive discussion on current affairs and issues)

1600 UTC / 11am E / 8am P - Page 50 Freqs

DAILY

1630	R. Austria Int.	Report from Austria (a daily magazine focusing on Austria and central and eastern Europe)

SUNDAY

1600	KWHR(9930kHz)	DXing with Cumbre (Marie Lamb with the hottest DX catches)
1601	BBCWS(am)	Concert Hall (classical music recitals and performances)
1605	R. Australia	The National Interest (Terry Lane's round-up of the week's major issues)
	R. Canada Int.	The Sunday Edition (continues from 1410)
	R. Netherlands	Wide Angle (a weekly in-depth look at a news topic)
1635	R. Austria Int.	Insight Central Europe (regional current affairs magazine produced jointly by R. Prague, R. Austria Int., R. Slovakia, R. Polonia and R. Budapest)

MONDAY-FRIDAY

1600	BBCWS(am)	World Briefing
	R. Netherlands	Newsline (RN's flagship current affairs magazine)
1605	R. Australia	Bush Telegraph (a daily magazine highlighting rural and regional issues)
1620	BBCWS(am)	British News
1645	BBCWS(am)	Sports Roundup (all the daily sporting news worldwide)

MONDAY

1630	BBCWS(am)	Analysis (background to a story in the news)

TUESDAY

1630	BBCWS(am)	Analysis (background to a story in the news)

WEDNESDAY

1630	BBCWS(am)	From Our Own Correspondent [refer to 1505 S]

THURSDAY

1630	BBCWS(am)	Analysis (background to a story in the news)

FRIDAY

1630	BBCWS(am)	Analysis (background to a story in the news)

SATURDAY

1605	BBCWS(am)	Sportsworld (continues from 1405)
	R. Australia	Nocturne (continues from 1505)
	R. Canada Int.	Quirks and Quarks (Bob McDonald with what's new and next in science)
	R. Netherlands	Europe Unzipped [refer to 1435 A]
1635	R. Austria Int.	Network Europe (a weekly magazine on Europe)

1700 UTC / 12pm E / 9am P - Page 51 Freqs

DAILY

1700	R. Japan	News (a round-up of Asian and world news)

SUNDAY

1705	R. Australia	New Dimensions [refer to 1405 A]
1710	R. Japan	Pop Joins the World (a look at Asia as it is now, presenting the cultures and lifestyles of other Asian countries through their popular music)
1730	VOA Africa	Music Time in Africa (Rita Rochelle highlights the best of traditional and modern African music)[broadcast in two editions with part two airing at 1930]

MONDAY-FRIDAY

1705	R. Australia	Australia Talks Back (
	VOA News Now	Talk to America (Carol Pearson hosts a worldwide call-in show featuring American decisionmakers, personalities and experts)
1715	R. Japan	44 Minutes (current affairs magazine about Japan and Asia)

SATURDAY

1705	R. Australia	The Spirit of Things [refer to 1205 A]
1710	R. Japan	Hello from Tokyo (listener letters, music and short features)

2100 UTC / 4pm E / 1pm P - Page 53 Freqs

DAILY

2100	R. Japan	News (a round-up of Asian and world news)

SUNDAY

2100	BBCWS(am)	Newshour (60 minutes of news and analysis from around the globe)
	WBCQ(7415kHz.)	Radio Caroline ("Europe's first and only album station")
2105	VOA News Now	Jazz America (the best of jazz, past and present, with Russ Davis)
2110	R. Australia	AM (ABC Radio's flagship morning news magazine)
	R. Canada Int.	The Maple Leaf Mailbag (Ian Jones answers listener mail and hosts the fortnightly CIDX Report for dxers)
	R. Japan	Pop Joins the World (a look at Asia as it is now, presenting the cultures and lifestyles of other Asian countries through their popular music)
2130	R. Australia	Educational series (a series of documentary programs dealing with Asian or Pacific history, politics or communcations. Specific details were unavailable at deadline.)
2135	R. Canada Int.	Spotlight (a magazine touching on all facets of artistic and cultural life in Canada)

MONDAY-FRIDAY

2110	R. Canada Int.	Canada Today (daily magazine of intervi ews, correspondents' reports and Canadian views on world and national events)

MONDAY

2105	BBCWS(am)	Science in Action [refer to 1505 T]
	VOA News Now	American Gold (pop music classics with Ray Freeman)
2110	R. Australia	AM (ABC Radio's flagship morning news magazine)
2125	R. Japan	Japan Music Log (songs rooted in the lifestyles of each region of Japan, introducing the local traditions, history and culture)
2130	BBCWS(am)	The Giving Game [refer to 1530 T]
	R. Australia	The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
2135	R. Canada Int.	Media Zone (Ian Jones hosts a weekly forum with Canadian journalists discussing topical issues facing Canadians)

TUESDAY-SATURDAY

2115	R. Japan	Asian Top News (the day's major stories as reported by the region's radio stations)

TUESDAY

2105	BBCWS(am)	Health Matters [refer to 1505 W]
	VOA News Now	Roots and Branches (Katherine Cole with roots music)
2110	R. Australia	AM (ABC Radio's flagship morning news magazine)
2125	R. Japan	Let's Learn Japanese (a Japanese language lesson for beginners)
2130	BBCWS(am)	Everywoman [refer to 1530 W]
	R. Australia	Innovations (showcasing Australian invention, enterprise and ingenuity)
2135	R. Canada Int.	Spotlight [refer to 2135 S]

WEDNESDAY

2105	BBCWS(am)	Go Digital [refer to 1505 H]
	VOA News Now	Classic Rock (Ed Kowalski and Margot Braswell play classic rick tracks)
2110	R. Australia	AM (ABC Radio's flagship morning news magazine)
2125	R. Japan	Japanese Musical Treasure Box
2130	BBCWS(am)	Omnibus [refer to 1530 H]
	R. Australia	The Religion Report (Stephen Crittenden examines the way religion and societies interact)
2135	R. Canada Int.	The Maple Leaf Mailbag [refer to 2110 S]

THURSDAY

2100	WBCQ(7415kHz.)	Radio Caroline ("Europe's first and only album station")
2105	BBCWS(am)	Discovery [refer to 1505 F]
	VOA News Now	Top 20 Countdown (Ray McDonald surveys hit music in the USA)
2110	R. Australia	AM (ABC Radio's flagship morning news magazine)
2125	R. Japan	Brush Up Your Japanese (an intermediate course in Japanese)

Shortwave Guide

2130 BBCWS(am) Sports International [refer to 1530 F]
R. Australia Rural Reporter (ABC's rural reporters present news and stories from rural and regional Australia)
WWCR(9475kHz) World of Radio (the first weekly airing of Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
2135 R. Canada Int. Business Sense (an in-depth look at Canadian companies in the global economy)

FRIDAY
2100 WBCQ(7415kHz.) Radio Caroline ("Europe's first and only album station")
2105 BBCWS(am) One Planet [refer to 1505 M]
R. Australia Feedback (Roger Broadbent answers listener questions, provides regular updates about RA and delves into communications issues)
VOA News Now Country Hits USA (Mary Morningstar with country music)
2125 R. Japan Music Beat (contemporary Japanese popular music)
2130 BBCWS(am) Documentaries [refer to 1530 M]
R. Australia Oz Sounds (Australian new music releases)
2135 R. Canada Int. Canada in the World (Wojtek Gwiazda hosts a weekly magazine examining Canadian policies, priorities and international relations)

SATURDAY
2100 BBCWS(am) Newshour (60 min. of news and analysis from around the globe)
WBCQ(7415kHz.) Radio Caroline ("Europe's first and only album station")
2105 R. Australia Australia All Over (Ian McNamara—aka "Macca"—hosts this celebration of Australiana and traditional Australian customs and values)[begins at 1900]
VOA News Now Jazz America [refer to 2105 S]
2105 R. Prague Readings from Czech Literature
2110 R. Canada Int. Business Sense [refer 2135 H]
R. Prague Saturday Music (Czech classical, folk, jazz or rock music)
R. Japan Weekend Square (a program designed to present various aspects of Japan in a friendly and relaxed atmosphere with intervi ews, music and discussions)
2130 WWCR(15825kHz) Presidential Radio Address and the Democratic Party Response
2135 R. Canada Int. Canada in the World [refer to 2135 F]

2200 UTC / 5pm E / 2pm P - Page 54 Freqs

SUNDAY
2200 BBCWS(am) The World Today (the BBC's agenda-setting flagship global news program)
WBCQ(7415kHz) Radio Free Euphoria (freeform radio)
WHRI(5745kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
WRMI(15725kHz) Wavescan (a weekly program from Adventist World Radio for DXers and shortwave radio enthusiasts)
2205 R. Canada Int. Canada in the World [refer to 2135 F]
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2230 BBCWS (am) Agenda (ideas and trends shaping our world)
2230 RVi Belgium Radio World (Frans Vossen presents a weekly report about international radio)
2240 R. Australia The Australian Music Show (the latest rock music from the Triple J youth network of the ABC)
2245 R. Prague Readings from Czech Literature

MONDAY-FRIDAY
2200 R. Canada Int. The World at Six [refer to 2300 M-F]
2205 BBCWS(am) World Business Report
2220 BBCWS(am) British News
2230 BBCWS(am) Sports Roundup (all the daily sporting news worldwide)

MONDAY
WBCQ(7415kHz) Jean Shepherd (the noted humorist's classic radio programs from the 60s and 70s)
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2240 R. Australia Music Deli (Australian performances of folk, acoustic, traditional and world music)
2245 BBCWS(am) Analysis (background to a story in the news)

TUESDAY
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2240 R. Australia Blacktracker (Mat Holness presents contemporary Aboriginal music)
2245 BBCWS(am) Analysis (background to a story in the news)

WEDNESDAY
2200 WBCQ(7415kHz) The Clone Zone (ed. note: your guess is as good as mine!)
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2240 R. Australia Oz Country Style (country music from Australia)
2245 BBCWS(am) From Our Own Correspondent (the background to the news from BBC correspondents around the world)

THURSDAY
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2240 R. Australia Jazz Notes (Australian jazz presented by Ivan Lloyd)
2245 BBCWS(am) Analysis (background to a story in the news)

FRIDAY
2200 WBCQ(7415kHz.) Pan Global Wireless
WHRA(17650kHz.) DXing with Cumbre (Marie Lamb with the hottest DX catches)
2205 R. Australia Asia-Pacific Weekend Edition (reports and analysis on the region's events over the past week)
2230 R. Australia AM Saturday (the domestic ABC's Saturday morning news magazine)
WBCQ(7415kHz) Pab Sungenis Project (stand-up comedy and sketches)
2245 BBCWS(am) Analysis (background to a story in the news)

SATURDAY
2200 BBCWS(am) The World Today [refer to 2200 S]
WBCQ(7415kHz) HarvZower (a personal selection of contemporary music)
2205 R. Australia Correspondents Report (The ABC's overseas reporters give their interpretation and analysis of the week's major events)
R. Canada Int. Media Zone [refer to 2135 M]
2230 BBCWS(am) From Our Own Correspondent [refer to 2245 W]
R. Australia The Business Report (a weekly round-up of the latest business news and information from Australia and the world presented by Rachel Mealey)
RVi Belgium Music from Flanders (a half-hour of Flemish music, musicians and musical performances)
WHRA(17650kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
2235 R. Prague Insight Central Europe (regional current affairs produced jointly by R. Prague, R. Austria Int., R. Slovakia Int., R. Polonia and R. Budapest)

2300 UTC / 6pm E / 3pm P - Page 54 Freqs

DAILY
2300 BBCWS(am) The World Today [refer to 2200 S]

SUNDAY-THURSDAY
2300 *R. New Zealand Int. Midday Report (news updates and in-depth reports)

SUNDAY
2300 R. Canada Int. The World This Weekend (CBC weekend news magazine)
2310 R. Australia Asia Pacific (Radio Australia's flagship current events and business report for and about Asia and the Pacific region)
2330 People in the Know (interviews with prominent Chinese who are shaping the nation's future)
R. Australia Earthbeat (Alexandra DeBlas presents a program on environmental science)
R. Canada Int. The Inside Track (anthologies and documentaries about sports and those who compete in them)
2335 R. Netherlands Sincerely Yours (RN's listener response program)
2345 R. Prague Readings from Czech Literature
2355 R. Netherlands The Week Ahead (a preview of what's on RN the next seven days)

MONDAY-FRIDAY
2300 R. Canada Int. The World at Six (the CBC's flagship evening newscast)
2330 R. Netherlands Newsline (RN's flagship current affairs magazine)
R. Canada Int. As It Happens (Barbara Budd and Mary Lou Finley intervi ew newsmakers from the famous to ordinary people eyewitnessing news in the making)

MONDAY
2310 R. Australia Asia Pacific [refer to 2310 S]
2330 China R. Int. China R. Int. Biz China (business and finance in the Chinese market)
R. Australia The Buzz (the week's big technology news and issues presented by Richard Aedy)

TUESDAY
2310 R. Australia Asia Pacific [refer to 2310 S]
2330 R. Australia RA Arts (Julie Copeland presents the world of arts and cultural ideas)

WEDNESDAY
2300 WBCQ World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
2310 R. Australia Asia Pacific [refer to 2310 S]
2330 R. Australia Rural Reporter (ABC's rural reporters present news and stories from rural and regional Australia)

THURSDAY
2310 R. Australia Asia Pacific [refer to 2310 S]
2330 China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
R. Australia The Media Report (Mick O'Regan takes a critical look at the latest developments in the communications industry)
WBCQ(7415kHz) Uncle Ed's Musical Memories

FRIDAY
2305 R. Australia Lingua Franca (a program about language and its social, cultural and historical ramifications)
2310 *R. New Zealand Int. Focus on Politics (a report on government and politics in NZ)
2330 BBCWS(am) Global Business (Peter Day charts the transformations sweeping through the world of work and commerce)
China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
R. Australia The Sports Factor (Amanda Smith presents reports which debate and celebrate the cultural significance of sport)
*R. New Zealand Int. The Sampler (Nick Bollinger casts a critical ear over the latest CD offerings)
WBCQ(7415kHz) WDCD

SATURDAY
2300 R. Canada Int. The World This Weekend (CBC weekend news magazine)
WBCQ(7415kHz) Radio Timtron Worldwide
2305 R. Australia Ockham's Razor (sharp comnmentaries on scientific issues)
2310 R. New Zealand Int. *The Week in Parliament (a weekly roundup of NZ political news)
2320 China R. Int.In the Spotlight (Chinese arts and cultural magazine)
2330 BBCWS(am) Pick of the World (Daire Brehan presents World Servi ce highlights and talks with the producers and presenters of BBC programs)
R. Australia Innovations (a program showcasing Australian invention, enterprise and ingenuity)
R. Canada Int. Madly Off in All Directions (Lorne Elliott travels across Canada to capture the country's unique senses of humor)
*R. New Zealand Int. Spectrum (a weekly look at the people, places and events around NZ)
WRMI(15725kHz) Wavescan (a weekly program from Adventist World Radio for DXers and shortwave radio enthusiasts)
WHRI(9495kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
2335 R. Netherlands Europe Unzipped (a Ôzippy' compilation of news and views from Europe)
2340 R. Prague Saturday Music (Czech classical, folk, jazz or rock music)
2355 R. Netherlands Insight (Rob Green casts a critical and humorous eye on the past week's headlines)

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Bob Fraser, Cohasset, MA; Harold Frodge, Midland, MI; Glenn Hauser, Enid, OK; Bob Thomas, Bridgeport, CT; Harold Sellers, *BBC On Air; BCL News; BCDXC; Cumbre DX; DXA; DX Listening Digest; DX News; ODXA/DX Ontario; Fineware; Hard Core DX ; HFCC; ILG; NASWA; NASWA Flash Sheet; RFPI; World of Radio; Worldwide DX Club.*

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Monitoring Flight Demonstration Groups

Welcome to our annual frequency, equipment, and schedule review. There is nothing quite as thrilling as going to one of the many public air shows across the country and watching the Blue Angels or Thunderbirds flight demonstration team strut their stuff in front of thousands of fans. But if you add the element of radio to the visual drama in front of you, you will have a perspective that few will get to enjoy.

Since the 2003 air show season starts this month, in this edition of *Milcom* we will present our annual frequencies to monitor, review of equipment, and the military flight demonstration team schedules (Table One) for the upcoming air show season.

❖ Where is the action?

You will need to concentrate on four different bands for air show activity. Search in the 118-136 MHz band (AM mode at 25 kHz steps), 138-150.8 MHz band (minus 144-148, in both the AM and Narrow FM modes in 12.5 kHz steps), 118-136 MHz (AM mode in 25 kHz steps), and finally 225-420 MHz (AM in 225-400 in 25 kHz steps/Narrow FM in 406-420 MHz in 12.5 kHz steps). The following discrete frequencies have been reported in use by the **U.S. Navy Blue Angels** during the past five airshow seasons.

Frequency	Usage
142.000	Ground support (Comm cart) (NBFM mode)
143.000	Tower observer (NBFM mode)
143.600	Ground support, occasional air-to-air reported here (NBFM mode)
164.900	Engine start/Taxi out ground support (Comm cart) (NBFM mode)
168.900	Engine start/Taxi out ground support (Comm cart) (NBFM mode)
169.400	Engine start/Taxi out ground support (Comm cart) (NBFM mode)
170.900	Engine start/Taxi out/Maintenance ground support (Comm cart) (NBFM mode)
236.450	Fat Albert (Blues C-130 transport aircraft) (AM Mode)
238.150	Show center/Diamond formation (Aircraft 1-4)/Air-to-air enroute (AM Mode)
251.600	Solo formation (aircraft 5/6) air-to-air (AM Mode)
256.250	Usage unknown (AM Mode)
263.350	Diamond formation (aircraft 1-4)/Fat Albert (Blues C-130 transport aircraft) including the JATO flight demonstrations (AM Mode)
263.500	Blue Angels/Fat Albert (AM Mode)
264.550	Diamond (aircraft 1-4)/Solo (aircraft 5-6) formations (AM Mode)
275.350	Diamond formation (aircraft 1-4) air-to-air and all six aircraft air-to-air (AM Mode)
286.000	Usage unknown (AM Mode)
302.150	Miscellaneous air-to-air (AM Mode)
307.700	Show center/Diamond (aircraft 1-4) formation (channel 16) (AM Mode)
321.100	Blue Angel operations (AM Mode)
345.900	Taxi out/Solo formation (aircraft 5-6) air-to-air (AM Mode)

The **U.S. Air Force Thunderbirds** are always a crowd favorite. The following frequencies have been reportedly used by the Thunderbirds during the last five seasons.

140.400	Support aircraft: Cross country air-to-air (AM mode)
141.850	Four ship formation (Victor 1) show air-to-air which is linked to public address system (AM mode)
143.850	Four ship formation (Victor 2) air-to-air which is linked to public address system (AM mode)
235.250	Thunderbird control (AM mode)
269.900	Thunderbird control to the Air Boss (AM mode)
322.950	Solo aircraft (5-6) show air-to-air (AM mode)
413.025	Maintenance/ground teams <channel 1> (NBFM 146.2 PL tone)
413.100	Maintenance/ground teams <channel 2> (NBFM)
413.275	Maintenance/ground teams (NBFM)
413.375	Maintenance/ground teams (NBFM)

Both the Navy and the Air Force have aircraft **special demonstration units** in addition to the flight demonstration units mentioned above. Here is a list of known units and their frequencies (mode below is AM).

US Air Force F A-10 flight demo (nationwide): 32.350 34.125 34.175 34.350 34.375 34.575 36.150 36.350 36.850 38.670 40.200 46.650 49.750 139.675 140.000 (all tentative identifications, confirmation requested)
USAF F-15 flight demo (Misc): 275.675
USAF flight demo (East): 228.450 233.525 238.825 252.775 257.075 264.975 276.675 282.675 282.800 (S) 298.350 359.225
USAF flight demo (West): 384.550
USAF F-16 flight demo (Shaw units): 260.400 282.800
USAF F-117 flight demo discrete: 304.900
USAF Combat search and rescue demonstrations: 251.900
US Navy VF-101 flight demonstration: 311.500
USN F-14 flight demo: 299.500 311.500 341.200 342.900 342.950 345.000
USN F/A-18 flight demo: 333.300 (tentative)
US Coast Guard rescue demo: 381.800

❖ Military Parachute Teams

Look for communications from the colorful U.S. Navy Seal Parachute Team, known as the **Leap Frogs,** on 407.500 MHz. The U.S. Army Parachute Team, the **Golden Knights,** have been heard on 123.400, 123.475 or 123.500 MHz. You should also keep an eye on 32.300, 32.400, 122.575, 284.900 and 367.700 MHz for possible activity.

During 2001 I received several reports that the Golden Knights were using three civilian UHF frequencies – 462.625 (a business itinerant frequency known as Black Dot), 467.5625, and 467.6125 MHz. Some reports indicate they might be using Family Radio Service radios. It might be a good idea to keep FRS frequencies in your airshow scanner loadout.

❖ Other/Foreign Flight Demonstration Teams

The Canadian Forces aircraft demonstration team (431 Air Demonstration Squadron) is known as the **Snowbirds**. The following have been recently reported for this popular aerial team: 123.325, 246.500, 272.100 (air-to-air primary), 284.900 (solo aircraft), 299.500 (air-to-air enroute), and 333.300 MHz.

Other foreign and US flight demonstration teams reported during the past few years:

120.300	Extra 13
122.750	Patty Wagstaff
122.825	Ian Groom's FedEx
130.500	Spanish Military LA Patrulla Aguila
136.175	Chilean Military Halcones
136.975	UK Army Air Corps Blue Eagles Helicopter Northern Lights
138.450	France Air Force La Patrouille Adecco
141.825	France Air Force La Patrouille Adecco
143.100	France Air Force La Patrouille Adecco
243.450	UK Air Force Red Arrows
252.500	Spanish Military Aguila
255.100	UK Air Force Falcons
264.400	Turkish Military Stars
279.600	Turkish Military Stars
288.850	Swiss Military Patrouille Suisse
307.800	Italian Military Frecce Tricolori
465.100	UK Air Force Falcons
469.500	US Confederate Air Force Tora Tora Team
469.550	US Confederate Air Force Tora Tora Team

❖ Not Just Any Old Scanner Will Do

Some of the handheld scanners currently being marketed are ***not*** suited for air show monitoring. Scanners which don't allow independent transmission mode selection cannot be used for air show monitoring. For shows like the Thunderbirds you will need a scanner that can monitor the 138-150 MHz military land mobile band in the AM mode. Most Uniden scanners lock you into the FM mode in the 138-150 MHz frequency range.

You also need a scanner that has the 225-400 MHz military aeronautical band in it. Most of the action (especially the Blue Angels) will be heard in this UHF portion of the spectrum. Adding this criteria to the mix of possible radios narrows down our choice of air show scanners even further.

Below is a list of scanners that are capable of air show monitoring. This list continues to grow (especially in the area of wideband handhelds), and I am happy to report that the scanner enthusiast now has a wider range of products and prices to choose from than five years ago.

Please notice that the recommended antennas are omnidirectional rather than directional for monitoring the mil aircraft bands.

Information includes current Grove stock codes/prices (at presstime) for the items indicated, but does not include shipping or taxes (if applicable). Prices are subject to change without notice so be sure to call the Grove order department at 800-438-8155 or visit our website at **http://www.grove-ent.com** for current pricing.

Handheld Unit	Grove Stock No	Price
Alinco DJ-X3T	SCN11	$249.95
Alinco DJ-X10T	SCN01	$349.95
Alinco DJ-X2000T	SCN10	$499.95
AOR AR-8200 Mk III	SCN51	$589.95
Icom R-2	SCN05	$189.95
Icom R-3	SCN07	$449.95
Icom R-5	SCN02	$199.95
Icom R-10	SCN04	$349.95
Uniden BC-250F	SCN40	$369.95
Yaesu VR-500	SCN06	$324.95

Base/Mobile Unit	Grove Stock No.	Price
AOR-3000AB	SCN26	$1062.95
AOR-5000 +3	RCV42P	$2119.95
AOR-8600	SCN08	$889.95
Icom R-8500	RCV14	$1499.95
JRC NRD-545 w/converter	RCV21DS/ ACC11DS	$1799.95+ $349.00
Uniden BC-780 Base/Mobile	SCN49	$349.95
Uniden BC-785D Base/Mobile	SCN41	$369.95
Yaesu VR-5000	RCV51	$889.95

Computer Receivers	Grove Stock No.	Price
Icom PCR-1000	RCV45	$399.95
WinRadio WR-1550e	RCV47-E	$549.95
WinRadio WR-1550i	RCV47-I	$499.95
WinRadio WR-3150e	RCV48-E	$1849.95
WinRadio WR-3150i-DSP	RCV48-I	$1375.00
WinRadio WR-3500e	RCV49-E	$2395.95
WinRadio WR-3500i-DSP	RCV49-I	$2395.95
WinRadio WR-3700e	RCV50-E	$2895.95
WinRadio WR-3700i-DSP	RCV50-I	$2895.95

Antennas		
AOR DA-3000 (Base)	ANT11	$129.00
AOR MA-500 (Mobile)	ANT12	$99.00
AOR SA-7000 (Base)	ANT39	$199.95
Austin Condor Flex (Handheld)	ANT14	$29.95
Diamond Discone (Base)	ANT09	$99.95
Grove Omni-II (Base)	ANT05	$29.95
Nil-Jon Antenna w/NMO Base	ANT10NMO	$69.95
Nil-Jon Multiband (Base)	ANT10MBS	$89.95
Nil-Jon Super-M (Mobile)	ANT10	$79.95
Scantenna (Base)	ANT07	$54.95
Stealth Mobile Antenna (Mobile)	ANT30	$34.95

Another purchase you should consider is an extra set of charged batteries for your handheld. Nothing is worse than having your rechargeables die halfway through the show with your replacements at home in the shack.

During the 2003 season we want to hear from our readers about active air show/flight demonstration team frequencies. If you attend an air show, *please pass along what you hear*! Thanks to the dozens of contributors who took the time to share their reports with us last year. You can reach me via e-mail at **larry@grove-ent.com** with a subject line of **Airshow Intercepts**, or you can write us at: Milcom, 7540 Highway 64 West, Brasstown, NC 28902.

Table One: Military Jet Demonstration Teams

2003 Performance Schedule

Note: Demonstration schedules dates listed are subject to change.
Group Abbreviations
BA = USN Blue Angels
TB = USAF Thunderbirds
SB = Canadian Snowbirds

Base Abbreviations
AFB = Air Force Base
ARB = Air Reserve Base
JRB = Joint Reserve Base
MCAS = Marine Corps Air Station
NAF = Naval Air Facility
NAS = Naval Air Station

Dates	Group: Locations
Mar 15	BA: NAF El Centro, CA
Mar 15-16	TB: Luke AFB, AZ
Mar 22-23	BA: Punta Gorda, FL; TB: Tyndall AFB, FL
Mar 29-30	BA: Huntsville, AL; TB: Davis-Monthan AFB, AZ
Apr 5-6	BA: NAS Corpus Christi, TX; TB: March AFB, CA
Apr 12-13	BA: Vidalia, GA; TB: Wilmington, NC
Apr 19-20	Easter Holiday
Apr 26	TB: Greenville, SC
Apr 26-27	BA: Knoxville, TN; SB: Dobbins AFB, GA
Apr 27	TB: Patrick AFB, FL
Apr 30	SB: Spartanberg, SC
May 3-4	BA: MCAS Cherry Point, NC; TB & SB: Ft. Lauderdale, FL
May 7	SB: To be announced
May 10-11	BA: Topeka, KS; TB & SB: Barksdale AFB, LA
May 16-18	TB & SB: Andrews AFB, MD
May 17-18	BA: Millville, NJ
May 19	SB: Leamington, Ontario
May 21	BA: U.S. Naval Academy, Annapolis, MD
May 22	SB: Val d'Or, Quebec
May 23	BA: U.S. Naval Academy Graduation Flyover
May 24-25	BA: NAS Patuxent River, MD; TB: Pope AFB, NC; SB: Trois-Rivières, Quebec
May 28	TB: USAF Academy, CO; SB: To be announced
May 31	TB: Myrtle Beach, SC; SB: Alma, Quebec
May 31-Jun 1	BA: Millington, TN
Jun 1	TB: Columbus AFB, MS; SB: Canadian Forces Summer Kick-Off Event - Ottawa, Ontario
Jun 4	SB: Brandon, Manitoba
Jun 7-8	BA: Davenport, IA; TB: Mankato, MN; SB: 17 Wing Winnipeg, Manitoba
Jun 11	SB: Centralia, Ontario
Jun 14	TB: Whiteman AFB, MO
Jun 14-15	BA: New Windsor, NY; SB: Montreal, Quebec
Jun 15	TB: Sheppard AFB, TX.
Jun 21	TB: Sioux Falls, SD
Jun 21-22	BA: La Crosse, WI; SB: 8 Wing Trenton, Ontario
Jun 22	TB: Grand Forks AFB, ND
Jun 25	TB: Eielson AFB, AK; SB: Cobourg, Ontario
Jun 28-29	BA: North Kingstown, RI; TB: Elmendorf AFB, AK; SB: London, Ontario
Jul 1	SB: Canada Day - Ottawa, Ontario
Jul 3	TB: Battle Creek, MI
Jul 5-6	BA: Muskegon, MI; TB: Peoria, IL; SB: 15 Wing Moose Jaw, Saskatchewan
Jul 11-12	BA: Pensacola Beach, FL
Jul 12	TB: Missoula, MT
Jul 13	TB: McChord AFB, WA
Jul 17-20	BA/TB/SB: Dayton, OH
Jul 23	TB: Cheyenne, WY; SB: Terrace, British Columbia
Jul 26	TB: Selfridge ANGB, MI; SB: Chilliwack, British Columbia
Jul 26-27	BA: Arco, ID
Jul 27	TB: Grissom ARB, IN; SB: 19 Wing Comox, British Columbia
Jul 30	SB: Canadian Forces Base Esquimalt/Victoria, British Columbia
Aug 2-3	BA: Seattle, WA; SB: Red Deer, Alberta
Aug 6	SB: Vancouver, British Columbia
Aug 8-10	BA & SB: Abbotsford, British Columbia
Aug 9-10	TB: Hickam AFB, HI
Aug 16-17	BA: Westfield, MA; TB: Chicago, IL; SB: Lethbridge, Alberta
Aug 20	SB: Kenora, Ontario
Aug 23-24	BA: Weekend off; TB: Otis ANGB, MA; SB: Ottawa, Ontario
Aug 27	SB: Brantford, Ontario
Aug 30-31	TB: Quebec, Canada; SB: Toronto, Ontario
Aug 30-Sep 1	BA: Cleveland, OH
Sep 1	TB & SB: Toronto, Canada
Sep 6-7	BA: NAS Oceana, VA; TB: Nellis AFB, NV; SB: 12 Wing Shearwater, Nova Scotia
Sep 9	B: Bathurst, New Brunswick
Sep 11	SB: Stephanville, Newfoundland
Sep 11-13	TB: Reno, NV
Sep 13-14	BA: Indianapolis, IN; SB: Saint-Pierre et Miquelon, France
Sep 14	TB: Mt. Home AFB ID
Sep 17	SB: St Stephen, New Brunswick
Sep 18	TB: Andrews AFB, MD
Sep 20-21	BA: Duluth, MN; TB: Wichita, KS; SB: Niagara Falls, Ontario
Sep 27-28	BA: Fort Worth-Alliance, TX; TB: Janesville, WI; SB: Midland, TX
Oct 1	TB: Tucumcari, NM; SB: Vandenberg Air Force Base, CA
Oct 4-5	BA & SB: Long Beach, CA; TB: El Paso, TX
Oct 11-12	BA & SB: San Francisco, CA; TB: Ft Smith, AR
Oct 17	SB: Moose Jaw, Saskatchewan
Oct 18-19	BA: MCAS Miramar, CA; TB: Salinas, CA
Oct 25-26	BA: Jacksonville Beach, FL; TB: Edwards AFB, CA
Nov 1-2	BA: Randolph AFB, TX; TB: NAS JRB New Orleans, LA
Nov 7-8	BA: NAS Pensacola, FL
Nov 8-9	TB: Daytona Beach, FL

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APCO P-25 Family Traits

As more and more users become familiar with the new Uniden APCO Project 25 digital scanners, a number of questions have arisen regarding what kind of systems they should be able to monitor and what kind of performance they should expect.

Project 25 is a suite of standards spanning more than 30 documents, specifying in detail how each piece of radio equipment should operate. Such a thorough and complete set of standards makes it much easier for different departments and agencies to work together (planners use the term *interoperate*) and allows radio system owners to purchase equipment from competing vendors with some confidence that everything will work together properly.

The core of P-25 revolves around a standard called the *Common Air Interface* (CAI). The CAI specifies the layout and meaning of each digital message that is sent and received by a radio. The Phase I CAI has a number of requirements, the most relevant of which to a scanner listener is the use of the Improved Multi-Band Excitation (IMBE) voice encoder-decoder (*vocoder*) to carry voice signals digitally. (Phase II is a future standard that will operate in narrow 6.25 kHz channels.)

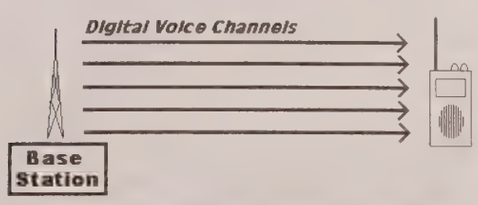
Some standards in the P-25 suite are mandatory, but many are not. Radio system owners may pick and choose from the optional standards, depending on what features they want to offer their users, their budget, and the product choices from the equipment vendors. The P-25 standard for trunking, for instance, is optional.

So, in any system you might run into, there are a number of possibilities.

❖ Voice Traffic

Voice traffic on the system may be all analog, all digital, or a mixture of both. Analog traffic can be heard with any scanner that can tune to the proper frequency. Digital traffic used to be completely out of reach, but now with the new Uniden scanners listeners can hear unencrypted IMBE voice traffic carried on systems that use the P-25 CAI.

There are other digital voice systems in operation, most notably older Motorola systems using a proprietary vocoder called VSELP (Vector-Sum-Excited Linear Prediction) and newer EDACS installations using Pro-Voice and AEGIS. The new Uniden scanners will not decode the audio from such systems. EDACS Pro-Voice systems happen to use the IMBE vocoder but the transmission formats are not compatible with the P-25 IMBE implementation.

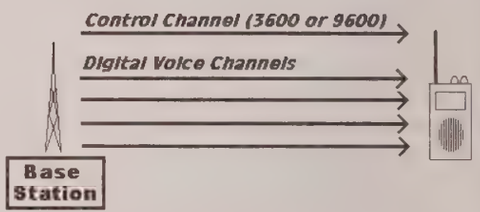


P-25 Conventional System Channels

❖ Trunking Formats

A radio system will either be conventional or trunked. If it is conventional, then the traffic on any particular radio frequency will always be from the same group of radio users. In other words, specific frequencies will be assigned to specific users in a conventional system. The Los Angeles, California, Police Department (LAPD) uses a P-25 system in conventional mode, meaning they do not have any trunking at all.

If a system with P-25 digital audio is trunked, it will almost always use one of two formats. The first format is the actual P-25 standard for trunking, which uses a 9600-baud control channel. These are common on the "pure P-25" systems, like the state of Michigan. The second format is a proprietary Motorola protocol running at 3600 baud, which is typically found on systems that have a mix of analog and digital radios. These control channels are dedicated to carrying trunking messages and do not carry voice traffic.



P-25 Trunked System Channels

Part of the confusion about this point may stem from the fact that Motorola uses the marketing term "ASTRO" for all of their digital products, regardless of the actual type of voice coding and trunking method.

❖ Scanner Success

Below are three tables that indicate which types of systems a listener will be able to monitor with a particular type of scanner.

Table 1: Success with an analog non-trunk-tracking scanner

	None	Motorola 3600 baud	P-25 9600 baud
Analog only	Yes	Audio only	N/A
Analog and ASTRO VSELP digital	Yes for analog No for VSELP	Audio only for analog (no tracking) No for VSELP	N/A
Analog and P-25 IMBE digital	Yes for analog No for IMBE	Audio only for analog (no tracking) No for IMBE	Audio only for analog (no tracking) No for IMBE
ASTRO VSELP digital	No	No	N/A
P-25 IMBE digital	No	No	No

Table 2: Success with an analog trunk-tracking scanner

	None	Motorola 3600 baud	P-25 9600 baud
Analog only	Yes	Yes	N/A
Analog and ASTRO VSELP digital	Yes for analog No for VSELP	Yes for analog No for VSELP	N/A
Analog and P-25 IMBE digital	Yes for analog No for IMBE	Yes for analog No for IMBE	Audio only for analog (no tracking) No for IMBE
ASTRO VSELP digital	No	No	N/A
P-25 IMBE digital	No	No	No

Table 3: Success with a digital APCO-25 trunk-tracking scanner

	None	Motorola 3600 baud	P-25 9600 baud
Analog only	Yes	Yes	N/A
Analog and ASTRO VSELP digital	Yes for analog No for VSELP	Yes for analog No for VSELP	N/A
Analog and P-25 IMBE digital	Yes	Yes	Audio only for analog Audio only for IMBE (no tracking)
ASTRO VSELP digital	No	No	N/A
P-25 IMBE digital	Yes	Yes	Audio only (no tracking)

The column going down the left side indicates the types of voice traffic and the rows across specify the type of control channel. A "pure P-25" system, for example, uses P-25 IMBE voice and the P-25 9600 baud control channel, so the scanner results will be in the lower right-hand corner. A Motorola Type 1 system has analog only audio and a 3600-baud control channel, so results on that kind of system would be found in the top row, center column.

The first table indicates that a non-trunking scanner, as long as it can tune to the proper frequency, will be able to monitor the audio only from analog sources. Even if a system uses trunking, a non-trunking scanner will be able to pick up the audio on a particular frequency – but it may be difficult to follow the action since the scanner will not automatically retune during a trunked conversation. However, on lightly loaded trunked systems or during relatively quiet periods this method can work fairly well. I've found that even a ten-year-old Bearcat BC200XLT is useful in such situations.

The second table shows that with a trunk-tracking scanner like the Bearcat BC245XLT or Radio Shack PRO-92, the results are identical to the non-trunking scanner except that systems with a 3600-baud control channel are now automatically followed.

The third table shows the results for a digital scanner like the Uniden BC250D or 785D with the BCi25D APCO-25 card. Now the listener will have all the benefits of an analog trunk-tracking scanner, plus can hear any (unencrypted) P-25 IMBE traffic, regardless of which trunking method, if any, is in use.

Many P-25 trunked systems use a 9600-baud control channel, which means that the new Uniden scanners cannot trunk-track those transmissions. However, readers have reported some success in monitoring them in conventional mode.

To monitor 9600-baud systems, it was suggested that Uniden users try programming their scanner with each frequency in the system in descending order. Each frequency should be entered as conventional mode with delay off. Be sure to lock out the control channel. Scanning 9600-baud systems in conventional mode has been done with a fair amount of success, although it can get confusing during busy periods.

❖ State of Florida

A reader who wishes to remain anonymous writes in to let us know about the future plans for the Florida statewide trunked radio system.

I have been reading your APCO-25 systems guide in the December/January issues of Monitoring Times. I have one correction for you.

The new State of Florida system will be EDACS utilizing ProVoice-DES encryption, not APCO-25 trunking. During the set-up period, they are using conventional APCO-25 digital audio. But this will not be the final format used.

The new system will incorporate several new features:

First, it will be using the new 3rd generation ProVoice (IMBE) digital voice format, encrypted in DES (FIPS 140-1 Level-1). (Voice Guard was first generation. AEGIS was second generation.)

Second, it will have a new EDACS Security Key (ESK), which will encrypt the Control Channel data. This will prevent unauthorized radios on the system, and will prevent the newer EDACS Trunk Tracking scanners from following even any analog voice traffic that might appear on the system. The control channel is encrypted, so the scanner cannot follow it.

I thought you might be interested.

For some more background on the EDACS Security Key please see the *Tracking the Trunks* column from April 2002.

❖ Riverside County, California

Eric from Riverside, California, sent in his notes on the Riverside Sheriff's Department, including frequencies and a description of the different call signs. From his notes:

The Sheriff's Department for the western end of the county added new Mobile Data Terminals (MDTs) to the patrol units. They had to add five more frequencies. They use an Ericcson system with the following frequencies:

866.2125
866.2625
866.7125
866.7625
867.2125
867.7125
868.2125
867.2625
868.2625
868.7125
867.7875
868.7876

Unit Equipment

Civil = serving court papers (evictions, no trespassing, etc)
CP = citizen patrol
George = city of Norco
RC = transportation of prisoners
Star 80 or 81 = air unit helicopter only
Zebra = auto theft

Edward Units

Edward = Riverside Sheriff's Department, shifts 1, 2 and 3

1, 2, 3 Edward 11 to19	Rubidoux – Highland area (Beat 1)
1, 2, 3 Edward 20 to 29	Mira Loma - Pedley area (Beat 2)
1, 2, 3 Edward 30 to 31	El Cerrito – Eastvale area (Beat 3)
5 Edward 410 to 419	CAT (Community Action Team), Rubidoux – Highland area
5 Edward 420 to 429	CAT team, Mira Loma - Pedley area
5 Edward 430 to 449	CAT team, El Cerrito – Eastvale
5 Edward 450 to 460	School Resource Officer
Edward 110 to 200	Supervision or Lead Officer
Edward 20 to 30	Lieutenants
Edward 1 to 20	Captains or higher

Talkgroups

Riverside Main Dispatch
Channel 2 Car to Car
Channel 3 Alternate Dispatch
Channel 4
Channel 5

Moreno Valley, Contract city
Moreno Valley, Car to Car, channel 7
Moreno Valley, Alternate, channel 8
Moreno Valley, Channel 9
Moreno Valley, Channel 10

Wants/Warrants, West End Channel 12
Detectives, West End, Channel 15
District Attorney, West End, Channel 19
Coroner, West End, Channel 22
Riverside Police Phone Patch, Channel 32

That's all for this month. I welcome updates, corrections and additional information via electronic mail at dan @ signalharbor.com. There is further information, frequencies and links on my web site at http://www.signalharbor.com. Until next month, happy monitoring!

Larry Van Horn, N5FPW
larryvanhorn@monitoringtimes.com

Monitoring Phoenix - The Land of the Sun

The sixth largest city in the United States is located in the state of Arizona. The hub of the southwest, Maricopa County is one of the fastest growing metro areas in the United States. Its 9,000 square miles of land includes the object of our profile this month – the city of Phoenix and the 22 communities surrounding it.

Remember, these area profiles are not meant to be complete, but they are a good representative survey of what frequencies are available in each area and are based on the best information we have from open sources. I strongly urge our readers in the areas we profile to please send us updates. We cannot personally visit every area we cover in this column, so I am relying on those of you who live in the areas we profile to compare our information with what you are hearing.

Also, we will not cover any Department of Defense (DoD) frequencies in these profiles. Complete nationwide coverage of those frequencies is now available for purchase on CD-ROM in the *Grove Military Frequency Directory*. You can find out more information about that product on the Grove website at **http://www.grove-ent.com**

Here is the *Fed Files* profile for Phoenix, Arizona, and surrounding communities.

HIGH FREQUENCY
(Frequencies in kHz and mode USB or as indicated):

Federal Bureau of Investigation: 2810.0 4991.0 5060.0 5390.0 7905.0 9185.0 9240.0 9313.0 10500.0 10915.0 11075.0 11491.0 12140.0 14460.0 14495.0
Federal Highway Administration (WWJ94): 3303.0 4965.0 5350.0 7736.0 9930.0 11045.0 12063.0 12158.0 14461.0 15969.0 18403.0 20843.0 22975.0 24040.0 24973.0 26703.0
FEMA (WGY 949): 2320.0 2360.0 11801.0 11957.0
National Weather Service (KHB21): 2773.0 2776.0 3360.0 3363.0 5932.0 5925.0 5937.0 6936.0 6979.0 9949.0

VHF/UHF
(Frequencies in MHz and mode narrowband FM or as indicated)
Animal and Plant Health Inspection Service: 166.5625/164.9125 415.250/411.250 415.300/411.275
Bureau of Alcohol, Tobacco and Firearms: 165.2875/166.5375
Bureau of Prisons: 170.650 170.875 170.925 171.175 409.250
Bureau of Indian Affairs: 164.8625 165.6875 406.475 412.275/408.725
Bureau of Land Management: 168.300 169.225 414.975 417.725/416.125
Bureau of Reclamation: 164.475 166.000/166.6375 169.650 171.725 415.175 416.025/419.625 417.775/411.625
Bureau of Veterans Affairs (KLM545): 34.670 164.175 164.9875 166.200 168.000 171.3875
Customs Service: 165.2375/166.5875 166.4375 169.450 171.075
Department of Energy: 170.075 171.150 411.875
Department of Labor: 164.700 406.200
Drug Enforcement Administration: 419.325/414.400
Federal Aviation Administration: 162.275 162.350 165.6625 165.7625 169.300 172.175 172.900 172.975 410.300
Federal Bureau of Investigation: 162.6375 162.7625 163.8625 167.2375 167.4875 167.5375 167.5625
Federal Communications Commission: 167.050 172.800
Fish and Wildlife Service: 164.625/163.150
Forest Service: 411.375/415.275
Immigration and Naturalization Service: 163.650/162.850 162.875 162.950 163.675 163.725/162.975 163.750 163.775 165.875 168.900 168.950 168.975
Marshals Service: 162.7125 162.7875 163.200 163.8125 170.750 170.800 170.850 411.000 411.100 412.650 414.050/411.050 417.100/411.175
NOAA Weather Radio: 162.525 162.550 162.575
Postal Service: 169.850/170.600 170.175 173.7875 408.050 408.175 409.275 410.200/407.175 410.325 415.050/407.725 416.425/410.025 418.100/414.725
Secret Service: 164.650 (Tango) 164.8875 (Oscar) 165.2125 (Mike) 165.375 (Charlie) 165.7875 (Baker) 166.400 (Golf)
Soil Conservation Service: 164.9375/164.150
Treasury Common: 166.4675
White House Communications Agency: 162.6875 171.2875

As part of our metro profiles I also include FAA Air Traffic Control allocated frequencies for the major airports in the area we are covering. In the Phoenix area there is one major airport: Phoenix Sky Harbor International Airport. Mode for these transmissions is AM.

PHOENIX SKY HARBOR INTERNATIONAL AIRPORT (KPHX)
Phoenix, Arizona

Automatic Terminal Information Service (ATIS): 121.200
Clearance Delivery: 118.100 269.200
Ground Control: 119.750
132.550 (North)
269.200 (South)
Control Tower:
118.700 (Runways 08/26)
120.900 (Runways 07R/25L and 07L/25R)
254.300 (Runways 07R/25L and 07L/25R)
385.400 (Runways 08/26)
Unicom: 122.950
Phoenix Approach/Departure:
119.200 North (319-075 deg 7,500 ft and above)
120.700 North (319-057 deg below 7,500 feet)
123.700 South (119-138 deg below 7,500 feet and 139-191 deg below 8,500 feet)
124.100 South (058-118 deg 10,500 feet and above, 119-139 deg above 14,500 feet, 139-191 deg

	8,500 feet and above, and 192-263 deg 12,500 feet and above)
124.900	South (058-118 deg below 10,500 feet)
126.800	South (119-138 deg 7,500-14,500 feet and 192-263 deg 7,500-12,500 feet)
128.650	North (340-079 deg above 5,500 feet)
239.000	North (319-057 deg below 7,500 feet)
256.900	South (119-138 deg 7,500-14,500 feet and 192-238 deg 7,500-12,500 feet)
269.600	South (058-118 deg 10,500 feet and above, 19-138 deg above 14,500 feet, 139-191 deg 8,500 feet and above, and 192-263 deg above 12,500 feet)
281.450	North (319-057 deg 7,500 feet and above)
285.550	North (340-079 deg above 5,500 feet)
353.800	South (058-118 deg below 10,500 feet)
363.000	South (119-138 deg below 7,500 feet and 139-191 deg below 8,500 feet)

❖ Space Shuttle Launch Frequency Update

Our regular reporter from Florida, Allan Stern, passes along the following update of frequencies monitored during a recent space shuttle launch. Thanks, Allan, for the profile.

VHF/UHF

(Frequencies in MHz, mode AM or as indicated)

46.650	JOLLY Air-to-Air (FM mode)
118.900	Space Coast RAP (SCRAP) Tower
121.500	STEALTH CONTROL (MRU); SHARK F-16 with intruder aircraft: N5212E
123.475	BAT (Airscan security Cessna Skymasters) working BATCAVE at SCRAP
126.650	NASA 947, NASA 967 pre-launch weather reports
128.550	NASA Shuttle Landing Facility Tower
132.650	Daytona Approach; BCSO STAR 1 helo chasing intruder aircraft N5212E
133.750	Patrick AFB Tower
133.800	CAPE CONTROL with many aircraft, including SHARKs (Homestead Air Reserve Station 482FW/93FS F-16 aircraft #86-0319) in combat air patrol. Intruder aircraft: N5212E
134.950	Daytona Approach Control
138.450	DOD CAPE working KING 1
138.475	JOLLY Operations, Air-to-Air
139.800	SHARKs (Combat Air Patrol aircraft) Air-to-Air
141.300	KING 3 (HC-130) working JOLLY 1 (HH-60G)
148.485	Kennedy Space Center Photo Operations (FM mode)
243.000	KING 1 working WARSHIP 987 (aka *USS O'Bannon* DD-987)
252.000	GATORs (Combat air patrol aircraft) working OAK GROVE (NORAD-Tyndall)
264.800	CAPE CONTROL working SHARKs
265.400	Combat Air Patrol and Aerial Refueling; SHARKs, GATORs, TANKER 27, OAK GROVE
269.375	Patrick AFB Tower
281.425	Daytona Approach Control
282.800	KING 1 calling WARSHIP 987 (see 243.000)
284.000	NASA-Kennedy Space Center Shuttle Landing Facility (SLF) Tower
294.600	VARIETY (Range Safety Officer) working JOLLYs/KINGs rergarding boats; relay of KING/JOLLY communications
321.000	JOLLYs/KINGs Operations
372.200	Patrick Pilot-to-Dispatcher (PTD) working KING 1
408.150	Kennedy Space Center Convoy (FM mode)

HF

(Frequency in kHz, mode USB)

5190.0	CAPE RADIO, KINGFISHER, Cape Comm, KING 1, *Liberty Star*, and *Freedom Star* Solid Rocket Booster recovery ships
5211.0	CAPE RADIO, DOD CAPE, Cape Osborne, "BRD," *Liberty Star* and *Freedom Star* Solid Rocket Booster recovery ships, Warship 987 (*USS O'Bannon*)
10780.0	CAPE RADIO

I am looking for anyone in the Space Coast area with an APCO P-25 digital scanner that can give us an update on the NASA UHF trunk system. Please contact us at the email address in the masthead.

❖ DOI Purchasing APCO P-25 Equipment

EFJ, Inc. recently announced that its E.F. Johnson Company subsidiary has received a contract award to supply Project 25 compliant Land Mobile Radio equipment to the Department of Interior (DOI). This contract provides for Project 25 compliant radio communication and control equipment, test equipment, and miscellaneous services. The contract is an indefinite quantity, indefinite delivery, open to all federal agencies. Many thanks to Marcel and the SCAN-L newsgroup for the information above.

We will continue to see more APCO-25 systems come online in the federal frequency bands and I hope that users of the new Uniden BC-250D and BC-785D will let us know what federal systems they are hearing using digital modes. Keep in mind that in addition to regular digital trunk decoding, these new scanners' digital decoder will handle conventional (repeater or single frequency simplex APCO-25 transmissions) APCO-25 compliant signals. So it's time to drag out the frequency guides and start scanning through the federal land mobile bands looking at all those digital signals again and see how many can be decoded with the new Uniden digital scanners.

❖ Coast Guard "Rescue 21" is Being Deployed

Rescue 21, soon to be the primary maritime "911" system for U.S. coastal waters and navigable rivers and lakes, is being deployed to Coast Guard units throughout the United States. Last year the government awarded a $611 million contract to General Dynamics of Scottsdale, AZ, for production, deployment and support of the system.

"Rescue 21 will help take the search out of search and rescue in the 21st century," said Vice Adm. James D. Hull, Coast Guard Atlantic Area commander.

Rescue 21 will greatly increase detection and localization of distress calls and eliminate known radio coverage gaps. This will benefit the maritime community from South Carolina to the Florida Keys to Puerto Rico and the Virgin Islands, as Seventh Coast Guard District personnel conduct more than 7,000 search and rescue cases a year.

The Coast Guard's current system is difficult to maintain and inadequate to meet the future safety requirements of the growing marine traffic. Modernizing the nation's maritime 911 system is an absolute must to ensure America's boaters remain safe. The new system will help minimize the time that search and rescue teams spend looking for people in distress, while maximizing communications. This, in turn, helps the Coast Guard to save more lives.

"We are excited about the Coast Guard's forward thinking initiative to modernize their distress response technology to meet the growing needs of the marine community for the 21st century," said Frank Herhold, executive director of the Marine Industries Association of South Florida. "The recreational boating community recognizes the value of the Coast Guard in South Florida and is glad to see it being funded with the resources it needs to ensure safety of life at sea."

Rescue 21 will also assist the Coast Guard in enforcing laws, preventing terrorism and security threats, and reducing damage to the environment. Improved awareness of unit location and communications connectivity to other agencies will enhance homeland security.

The Rescue 21 deployment will begin in the northeastern regions. Concurrently, the system will be deployed in the St. Petersburg, FL, region. All regions are scheduled to be completed by September 2006.

And that will do it for the edition of *MT*'s *The Fed Files*. Until next time, 73 and good hunting.

Doug Smith, W9WI
dougsmith@monitoringtimes.com

Moving Day, Part 2

"Would the last AM engineer in Canada please turn off the tower lights?"...

Here's a surprising statistic. Over the last few years, at least *19 percent* of the AM stations in Canada have moved to FM. Nearly *one-quarter* of the AM stations that existed in Canada 10 years ago are no longer on the air.

In December, the Canadian Radio-Television and Communications Commission (CRTC) granted permission for six AM stations to replace their AM transmitters with FM. At the same time, DXers reported the death knell for CFOB-640 Fort Frances, Ontario; the station has replaced its programming with an announcement asking listeners to tune to 93.1 FM instead. CFOB will be long gone from AM by the time you read this.

The sidebar lists the six stations that have been granted FM frequencies. (The Lloydminster station needs two FM transmitters to duplicate their AM coverage; the 101.3 transmitter will be located at Bonnyville, Alberta.) You should expect these FM stations to appear any day now if they aren't already on. The AM stations generally continue to operate, simulcasting the FM, for six months or so. They then run an announcement asking listeners to switch to FM (just as CFOB is doing) for a few weeks before shutting down the AM transmitter permanently.

Or at least it is usually permanent. Sometimes these silent AM stations reappear as something else. When CJMS-1280 went silent in Montreal a few years ago, multilingual station CFMB-1410 took over their 1280 facility. The former CBF/CBM frequencies of 690 and 940, also in Montreal, are now home to all-news stations CINF and CINW.

The 850 kHz frequency at Abbotsford, British Columbia, was recently abandoned by CFSR in favor of 107.1 FM. There is now an application to resurrect 850. Aboriginal Voices Radio was recently granted a new FM station in Vancouver. They've now applied to use the old CFSR transmitter as a relay facility. If granted, this would be a mostly-English station with programming intended for area First Nations people.

Another Canadian AM station that went silent a few years ago was CBJ-1580 Chicoutimi, Quebec. CBJ jumped ship in favor of 93.7 FM; since then, DXers in the East have been cleaning up on this largely open channel. Their DX fest may not last much longer, though. CHUC-1450 Cobourg, Ontario (about 100km/60mi. east of Toronto on Lake Ontario) has been granted permission to move to 1580 kHz with 10,000 watts fulltime.

Two Canadian AMs have been granted permission to increase power, one of them receiving a frequency change in the process. CFYZ-1280 at the Lester Pearson (Toronto) Airport will stay on 1280, but will increase power from 25 watts day/99 watts night to 400 day/150 night. This station is already being heard at surprising distances from the airport; expect even better DX.

At the other end of the country, the CBC's CBRU-1260 at Squamish, BC (30mi./50km north of Vancouver) will become more DXable. CBRU is moving to the 1270 kHz channel abandoned by CKSR Chilliwack (in favor of 98.3 FM...). CBRU will also increase power from 40 watts to 400 daytime/200 night. This station, too, has been heard at surprising distances, and will now do even better. It simulcasts CBU-690 Vancouver.

If you're a Canadian listener, I suppose all this is good news. I recently spent a night in Lethbridge, Alberta (population 63,000) and had no AM locals whatsoever. Fredericton, New Brunswick (pop. 47,000) and Red Deer, Alberta (63,000) have also lost all their locals. Saint John, New Brunswick (72,000); Sudbury, Ontario (92,000); and Brandon, Manitoba (39,000) only have one local AM. If you're looking for Canadian DX here in the States, though, you'd better act fast. At this rate, in a few years it could be impossible to log Canada on the AM band!

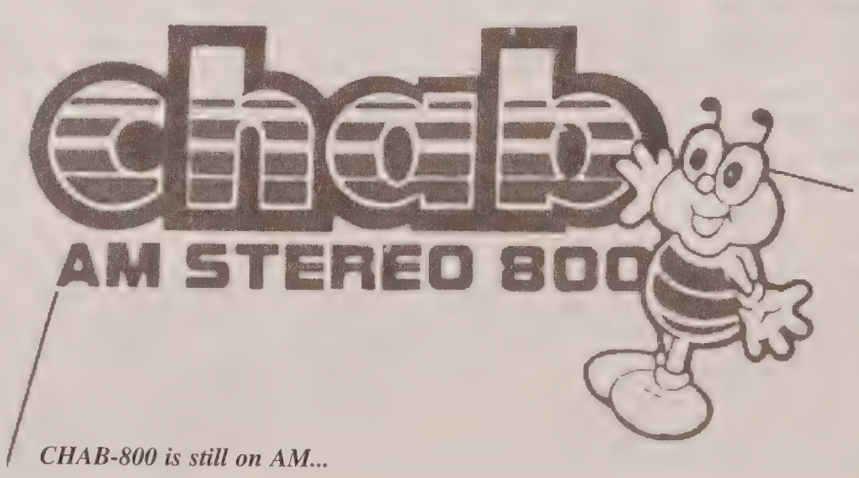
Canadian AM stations moving to FM

CKSA-1080	Lloydminster, AB/SK	to 95.9/101.3
CKTK-1230	Kitimat, BC	to 97.7
CJCI-620	Prince George, BC	to 97.3
CBZ-970	Fredericton, NB	to 99.5
CJLS-1340	Yarmouth, NS	to 95.5
CFVM-1220	Amqui, QC	to 99.9

❖ Bits and Pieces

- WLW-700 Cincinnati and WOR-710 New York are continuing to test IBOC digital at night. The tests are occasional and intermittent. My guess is they're trying to find a way to make IBOC operation at night possible without excessive interference to adjacent-frequency stations.
- The National Radio Club (NRC) has been running a "Frequency Challenge" – suggesting that the membership concentrate on DXing a specific frequency for a week and then compare notes. The first chosen frequency, 1150, proved very productive at my location with seven new loggings in one week! The other frequencies haven't done quite that well, but my log is still growing at a pretty good clip. Want to join the fun? **http://www.nrcdxas.org**, or send a 37-cent stamp to 2840 S.E. Illinois Ave., Topeka KS 66605-1427 for a sample newsletter.
- While on the subject of AM DX clubs, the International Radio Club of America (IRCA) has launched a new website on **http://www.ircaonline.org** . Features include a schedule of DX test broadcasts; information on joining the IRCA and/or ordering IRCA books; and a downloadable sample *DX Monitor*, among many other things. Check it out!

Have you heard any of the soon-to-vanish stations north of the border? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to *dougsmith@monitoringtimes.com.* Good DX!



CHAB-800 is still on AM...

George Zeller
georgezeller@monitoringtimes.com

Iraq War Begins with USA-Sponsored Clandestine Broadcasting

You may not have read about it in your local newspaper, but a war between the United States and Iraq actually started in early December, when USA-sponsored **Information Radio** broadcasts appeared on Iraqi airwaves. Leaflets dropped on Iraq by USA aircraft provided the station's frequencies, which are 9715 and 11292 kHz shortwave, supplemented by 756 and 693 kHz AM medium wave, and an FM service on 100.4 MHz. Initial schedules indicated five hour broadcasts beginning at 1500 UTC, which means that the station is a tough DX catch from North America, even on shortwave.

As is often the case during world conflicts, these transmissions come from USA military aircraft. During peacetime these aircraft are based at the 193rd Special Operations Wing near Harrisburg, PA. Several information sources reported that the Arabic language identification on this one is "Masdar Ma'ulumatikum, Idha'at Radiyo al-Ma'ulumat," which translates as **Information Radio** in English. Programming has been a mix of Iraqi pop music and news announcements.

❖ Saudi Clandestine

Middle East shortwave clandestine activity is not concentrated only in Iraq right now. A new clandestine targeted at Saudi Arabia, **Sawt al-Islah**, has been operating on 7590 kHz for two hours at 1900 UTC. This one is operated by the leftist Movement for Islamic Reform in Arabia, but it's a tough catch from North America at this time of day, even during the winter.

❖ Berkeley Bust

MT reader Artie Bigley noticed coverage by San Francisco Bay Area Independent Media Center of the December 11 FCC bust of **Berkeley Liberation Radio**. This local pirate had operated on 104.1 MHz FM prior to its closure by the FCC. Using a warrant, the FCC confiscated the transmitter and other broadcasting equipment during their raid. The station retains an internet web site at **http://www.peacehost.net/blr/** for those who are interested in the current status of this pirate operation, but for obvious reasons it lists no current broadcasting schedule.

The station had previously obtained a use permit from the Zoning Adjustments Board in Berkeley, and has had a variety of trips through the federal court system. Bryan Smith, a Berkeley Liberation Radio DJ, said in a press release that "This is a free speech issue and the FCC is trying to prevent us from exercising our First Amendment right." Despite this bust, *MT* confirms that they have occasionally returned to the air following the bust. Are any of our listeners in the Bay Area hearing this one anymore?

❖ Winter SWL Fest

March is the month each year when the **Winter Shortwave Listeners Festival** is held in Kulpsville, PA. This year March 7 and 8 are the days reserved for all the fun. The Fest always covers a wide variety of radio monitoring topics, including both licensed and unlicensed stations in all radio frequency ranges. Registration forms are available online at the **http://swlfest.com/** web site. This year's location, as always, is the Best Western The Inn at Towamencin, which is the same hotel that used to be a Holiday Inn. It's located right at the first exit north of Philadelphia on the Pennsylvania Turnpike Northeast extension. Several *Monitoring Times* staff members will be present as usual, and we hope to see you there.

❖ Steve Anderson Indicted

We previously reported in *MT* that Steve Anderson, former operator of **KSMR**, the only clandestine radio station in history that operated with both a transmitter location and a target area inside the United States (from Pulaski County, KY), had been arrested by federal authorities only miles from Brasstown, NC. On November 27, Anderson was indicted by a federal Grand Jury in London, KY, on several firearms charges. If convicted, Anderson could face lengthy imprisonment, a fine of up to $250,000, and confiscation of his firearms.

❖ What We Are Hearing

Our readers heard all of these North American pirate broadcasters this month. Most stations still transmit in the vicinity of 6955 kHz, although frequencies can vary up and down a little bit, often to avoid interference from the Peruvian broadcaster **La Voz de Campesimo** after sunset, which can frequently be heard in North America on 6956.5 kHz. Pirate broadcasting increases noticeably on weekends and during major holiday periods.

Captain Morgan- Normally this one programs rock music, but over the holidays Christmas music held the fort here. (None, asks for reports on the Free Radio Network)

Free Dylan Experience- Despite the Dylan name, their shows feature little of that folk singer's music. Recent programs have added a science fiction element. (None)

He Man Radio- He Man has returned with his amusing satire on macho male behavior. He claims to operate in upper sideband, "the manliest of all modes." (Blue Ridge Summit)

KIPM- Alan Maxwell's complex psychological dramas about disturbed individuals are the most unusual programming on the radio today, regardless of frequency. (Elkhorn)

KRMI- They are unrelated to WRMI, and they base their call letters on their "Radio Michigan International" slogan. (Uses KRMI6955@hotmail.com e-mail)

Montana Audio Relay Service- This one has returned, sometimes with novelty music programming, and sometimes with pirate relays. (Merlin)

Mystery Science Radio- This odd pirate mixes science fiction with novelty music. (Elkhorn)

Radio Alpha Lima International- Mike Prindle notes that their rock music shows on 6262.5 kHz are consistently the best heard Europirate in North America. Their web site at **http://www.alphalima.net** provides station information updates. (Uses *info@alfalima.net* e-mail)

Radio Azteca- Bram Stoker's comedies about DXers and DXing are targeted at all of us. (Belfast)

Radio Bingo- The pirate radio bingo game has been covering issues in the pirate scene lately. (Try Merlin)

Radio Goon- This one isn't heard very often, but when they are on, rock music is their staple. (None, asks for reports at the alt.radio.pirate newsgroup)

Radio Toronto- Normally their shows cover issues in the pirate radio scene, often with humor in the content. (Merlin)

Ragnar Radio- This new operation mixes rock music and conservative politics. (None, asks for reports on the Free Radio Network)

Shadow Radio- Their nostalgia format normally features relays of old-time radio shows, but sometimes they broadcast musical programming. (Uses *the_shadow6950@hotmail.com* e-mail)

Undercover Radio- Dr. Benway is already sending out QSLs from his new pirate station. (Uses *undercoverradio@mail.com* e-mail)

Voice of Captain Ron SW- The Captain is still with us. His unpredictable programming includes plenty of audio sound bits mixed in with random remarks. (Uses *captainronswr@yahoo.com* e-mail)

Voice of the Abnormal- Their musical selections match the station ID, and it's hard to tell what you will hear on any given day from their eclectic format. (Elkhorn)

WHYP- The James Brownyard memorial station broadcasts audio clips from a historic

continued on page 73

SATELLITE SERVICES

MT TRANSPONDER GUIDE *www.monitoringtimes.com/mtssg.html*

All Frequencies MHz

Robert Smathers
robertsmathers@monitoringtimes.com

SES Americom Americom-2

C-Band - 85 degrees West longitude

1(V)	3720	(none)
2(H)	3740	Occasional video / RAI International - Italian (occasional)
3(V)	3760	Occasional video
4(H)	3780	Occasional video
5(V)	3800	NASA Contract Channel
6(H)	3820	Data Transmissions
7(V)	3840	Occasional video
8(H)	3860	Data Transmissions
9(V)	3880	NASA Television
10(H)	3900	Data Transmissions
11(V)	3920	Occasional video
12(H)	3940	Data Transmissions
13(V)	3960	Data Transmssions / SCPC analog audio service 1179.40 80.60 NASA Space Shuttle audio (missions only) and International Space Station mission audio
14(H)	3980	Data Transmissions
15(V)	4000	Pennsylvania Cable Network (digital)
16(H)	4020	Data Transmissions
17(V)	4040	Data Transmissions
18(H)	4060	Data Transmissions
19(V)	4080	Data Transmissions
20(H)	4100	Data Transmissions
21(V)	4120	Autotote Horse Racing (digital) (occasional)
22(H)	4140	Worldnet Television, Voice of America (VOA) Radio, American Embassy Television Network, Radio Free Europe/Radio Liberty (digital)
23(V)	4160	Autotote Horse Racing (digital) (occasional)
24(H)	4180	Data Transmissions

SES Americom Americom-2

Ku-Band - 85 degrees West longitude

1(V)	11720	Occasional video
2(H)	11740	NBC Satellite Newsgathering feeds (digital)
3(V)	11760	Occasional video
4(H)	11780	NBC Satellite Newsgathering feeds (digital)
5(V)	11800	Occasional video
6(H)	11820	Occasional video
7(V)	11840	Occasional video
8(H)	11860	NBC Satellite Newsgathering feeds (analog and digital)
9(V)	11880	Occasional video
10(H)	11900	Occasional video
11(V)	11920	Occasional video
12(H)	11940	Occasional video
13(V)	11960	Occasional video
14(H)	11980	Occasional video
15(V)	12000	Occasional video
16(H)	12020	Occasional video
17(V)	12040	Occasional video
18(H)	12060	Occasional video
19(V)	12080	Occasional video
20(H)	12100	Occasional video
21(V)	12120	Occasional video
22(H)	12140	Occasional video
23(V)	12160	Occasional video
24(H)	12180	Occasional video

SES Americom Americom-3

C-band - 87 degrees West longitude

1(H)	3720	Data Transmissions / Associated Press Television (digital)
2(V)	3740	Data Transmissions
3(H)	3760	Data Transmissions
4(V)	3780	(none)
5(H)	3800	Occasional video
6(V)	3820	Fox Sports North, Fox Sports North - Wisconsin (digital) / Comcast SportsNet Mid-Atlantic (digital)
7(H)	3840	Data Transmissions
8(V)	3860	WNBC-TV New York City - Primetime 24 NBC affiliate (VC2+)
9(H)	3880	WPIX-TV New York City - WB affiliate (VC2+) 6.80 Talk America Radio Network
10(V)	3900	WKRN-TV Nashville, TN - Primetime 24 ABC affiliate (VC2+)
11(H)	3920	(none)
12(V)	3940	WSEE-TV Erie, PA - Primetime 24 CBS affiliate (VC2+)
13(H)	3960	Occasional video
14(V)	3980	Turner Classic Movies (VC2+)
15(H)	4000	KTLA-TV Los Angeles - WB affiliate (VC2+)
16(V)	4020	CNNfn (VC2+)
17(H)	4040	Christian-format radio (digital) / Data Transmissions
18(V)	4060	Fox Movie Channel (VC2+) 6.80 Premiere Radio Networks Channel 1
19(H)	4080	(none)
20(V)	4100	University Network - Dr. Gene Scott
21(H)	4120	CNN feeds (occasional)
22(V)	4140	Data Transmissions
23(H)	4160	Data Transmissions
24(V)	4180	(none)

SES Americom Americom-3

Ku-Band - 87 degrees West longitude

1(H)	11720	Data Transmissions / Stars of Faith (digital)
2(V)	11740	Data Transmissions
3(H)	11760	Occasional video
4(V)	11780	Data Transmissions
5(H)	11800	Data Transmissions
6(V)	11820	Occasional video
7(H)	11840	Data Transmissions
8(V)	11860	Occasional video
9(H)	11880	Occasional video
10(V)	11900	National Technology University (digital)
11(H)	11920	Data Transmissions
12(V)	11940	Occasional video
13(H)	11960	CNN Newsource (digital) / CNN Washington Newsource (digital)
14(V)	11980	Data Transmissions
15(H)	12000	Occasional video
16(V)	12020	Occasional video
17(H)	12040	Occasional video
18(V)	12060	Occasional video
19(H)	12080	Occasional video
20(V)	12100	Public Broadcasting Service (digital)
21(H)	12120	Public Broadcasting Service HDTV (digital)
22(V)	12140	Indiana Higher Educational Telecommunications Service (digital)
23(H)	12160	Public Broadcasting Service (digital)
24(V)	12180	Public Broadcasting Service (digital)

Loral Skynet Telstar 4

C-Band - 89 degrees West longitude

1(V)	3720	TEN*Max (VC2+)
2(H)	3740	Data Transmissions
3(V)	3760	(none)
4(H)	3780	TEN*Xtsy (VC2+)
5(V)	3800	TEN*BluePlus (VC2+)
6(H)	3820	Occasional video
7(V)	3840	The Erotic Networks (TEN) Promotional Channel
8(H)	3860	Fresh Network (VC2+)
9(V)	3880	Occasional video
10(H)	3900	Occasional video
11(V)	3920	Occasional video / CBS Network feeds (digital) (occasional)
12(H)	3940	ABC Network feeds (occasional)
13(V)	3960	CBS Network feeds (digital)
14(H)	3980	ABC Network feeds (occasional)
15(V)	4000	(none)
16(H)	4020	Occasional video
17(V)	4040	Occasional video
18(H)	4060	Public Broadcasting Service Schedule X
19(V)	4080	Occasional video
20(H)	4100	Occasional video
21(V)	4120	ABC Network feeds - West (LEITCH)
22(H)	4140	ABC Network feeds - East (LEITCH)
23(V)	4160	Occasional video
24(H)	4180	Occasional video

Loral Skynet Telstar 4

Ku-Band - 89 degrees West longitude

T01(V)	11730	South Carolina Educational Television (digital)
T02(H)	11743	Data Transmissions
T03(V)	11790	(none)
T04(H)	11803	Data Transmissions
T05(V)	11850	Data Transmissions
T06(H)	11863	Georgia Public Television (digital)
T07(V)	11910	Data Transmissions
T08(H)	11923	Data Transmissions
T09(V)	11971	ABC Satellite Newsgathering (analog and digital)
T10(H)	11984	ABC Satellite Newsgathering (analog and digital)
T11(V)	12033	Microspace Communications (digital)
T12(H)	12046	ABC Satellite Newsgathering (analog and digital)
T13(V)	12095	Florida Educational Television (digital)
T14(H)	12108	Louisiana Public Broadcasting (digital)
T15(V)	12157	Muslim TV Ahmadiyya (digital) / DMX for Business (digital)
T16(H)	12170	Occasional video

Panamsat Galaxy 11

C-Band - 91 degrees West longitude

1(H)	3720	WB 100+ Station Group (digital)
2(V)	3740	Fox Cable Networks (digital)
3(H)	3760	Black Entertainment TV / BET on Jazz (digital)
4(V)	3780	Fox Cable Networks (digital)
5(H)	3800	Fox Cable Networks (digital)
6(V)	3820	Game Show Network (VC2+) 7.30, 8.06 Cable Radio Network
7(H)	3840	The Golf Channel (VC2+)
8(V)	3860	Occasional video
9(H)	3880	Access Television 1, Access Television 2, Bloomberg TV (digital)
10(V)	3900	Shop at Home (analog) / Shop at Home (digital)
11(H)	3920	Eternal Word Television Network International (digital)
12(V)	3940	WE: Women's Entertainment (VC2+)
13(H)	3960	Ovation, KXLA-TV, KVMD-TV, KJLA-TV, Varsity TV, JCTV, Church Channel (digital)
14(V)	3980	Independent Film Channel (VC2+) 7.38 RAI Satelradio Italy
15(H)	4000	The Word Network (digital)
16(V)	4020	Ascent Media (digital)
17(H)	4040	Occasional video
18(V)	4060	Fox News Channel (VC2+)
19(H)	4080	KLUZ-TV Albuquerque (digital) / America's Collectibles Network (digital)
20(V)	4100	Occasional video
21(H)	4120	Southern Entertainment Television (SET) Southern Gospel Music Channel, SET Bluegrass Music Channel, SET Traditional Black Gospel Music Channel (digital)
22(V)	4140	Fox Cable Networks (digital)
23(H)	4160	Fox Cable Networks (digital)
24(V)	4180	International Channel, TV-5, CCTV-4 (digital)

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Lowfer Roundup, Loggings

There's still time to hunt for Lowfer (low frequency experimental radio) stations before the improved conditions of winter fade away. Lowfers are experimental stations that operate license-free under Part 15 of the FCC rules and regulations. These rules allow a maximum power of 1 watt and an antenna length (including feedline) of no more than 15 meters (50 feet). Transmissions are limited to the frequencies between 160 and 190 kHz. Out-of-band emissions, such as harmonics or spurious signals, must be attenuated by at least 20 dB. Any transmission mode is allowed except for damped waves (spark gap).

Despite some seemingly severe handicaps, Lowfers routinely are heard at distances of up to 400 miles – sometimes much farther. Table 1 contains a listing of Lowfer beacons believed to be active at this writing. The data comes from the *Lowdown*, the monthly journal of the Longwave Club of America (**http://www.lwca.org**). The LWCA website is an excellent source of information about Lowfers, their operating modes and antenna systems.

For your best shot at hearing these stations, put on a good pair of headphones, switch in a narrow bandwidth filter, and slowly sift through the band. You should try this at various times of the day. Surprisingly, some of my best Lowfer catches have been in full daylight during the mid-morning hours. A Lowfer QSL is one of the most prized verifications you can get, and I'm pleased to report that most Lowfers are excellent QSLers. If you hear one of these experimental stations and need a mailing address, please drop me a line. I can provide mailing information for many stations in North America.

Table 1. Lowfer Experimental Beacons

Freq.	ID	Location
164.900	KFLB	Sunnyvale, CA
169.863	R	Durant, OK
170.000	LAB	Daytona Beach, FL
171.200	YTN	Mineola, FL
175.000	D	Des Moines, IA
181.167	IZJ	San Gabriel, CA
181.500	DPC	Swansea, MA
182.200	BRO	Duluth, MN
182.500	UD	Wakefield, QC
182.516	NR	Riverside, CA
183.140	IHX	Olean, NY
183.160	PRK	Saratoga, CA
183.500	ELU	Simi Valley, CA
183.544	MEL	San Jose, CA
184.600	JJX	Garden City, NY
184.701	LEK	Aitkin, MN
185.000	WMT	Westfield, MA
185.185	FAW	Riverton, UT
185.299	TMO	Central NY
185.300	NC	Stanfield, NC
185.300	WA	Andover, MA
185.300	IP	Agricola, MS
185.301	VD	Burlington, CT
185.302	TAG	Holden, MA
185.303	WE	St. Francis, MN
185.500	RED	Wausa, FL
185.538	RLD	Stanfield, NC
185.970	YK	Evansville, IN
186.375	BA	Lancaster, IL
186.920	RB	Freeport, IL
186.940	BOB	Mahomet, IL
187.460	BK	Shell Lake, WI
187.500	3GOATS	Canby, OR
187.500	BL	Xenia, OH
187.500	YD	White City, FL
187.591	CO	Pikes Peak, CO
188.000	PHR	San Antonio, TX
188.800	COV	S. Coffeyville, OK
189.200	SAM	Crystal, MN
189.200	GIR	New Eagle, PA
189.501	TH	Colts Neck, NJ
189.650	NWNJ	Hainseville, NJ
189.800	RM	Duluth, MN
189.900	BZS	Avondale, AZ

Silent Key

I'm saddened to report the passing of Terry F. Krey, N5TKR of Austin, Texas. Terry was a frequent contributor to this column from my earliest days with *Monitoring Times*. I came to think of him as "Mr. VLF" as he focused much of attention on the obscure stations operating below 150 kHz. Terry always encouraged listeners to explore this neglected part of the band, and was an avid VLF antenna experimenter himself. His cheerful letters and words of encouragement will be missed at *Below 500 kHz*.

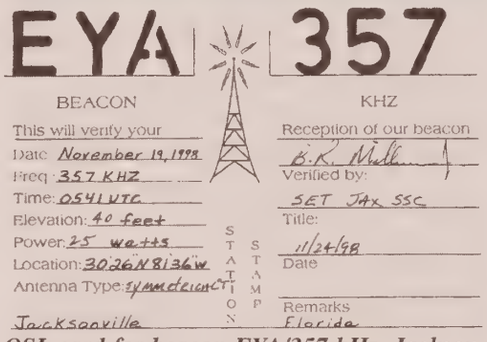
Loggings

Over the holidays, George Herr (CA) managed to fit in some DXing from his location near the LAX airport. Despite being in an urban setting and surrounded by power lines, George reports some very good catches with his Drake R8B and Radio West loop. See Table 2 for a list of NDBs he was able to hear.

Barry Williams (AL) sent a follow-up report to his loggings that appeared in the January issue. Using his WWII vintage RBL-5 receiver, a Quantum QX Pro loop and a JPS NIR-12 DSP unit, Barry pulled in several beacons from distances of over 4,000 miles. One station in particular, 280 kHz/T in Trelew, Argentina, took the prize at 5,383 miles! The ID hung in there for 3 minutes in heavy competition with IPA, Easter Island, also on 280 kHz. This is perhaps the most distant South American logging I have ever received. Barry's entire list of DX logs appears in Table 2.

Table 2. Selected Beacon Loggings

Freq.	ID	Location	By
206	GLS	Galveston, TX	G.H. (CA)
233	LG	Long Beach, CA	G.H. (CA)
255	ESC	Argentina	B.W. (AL)
255	JUJ	Argentina	B.W. (AL)
278	OS	Los Angeles, CA	G.H. (CA)
280	IPA	Easter Island, Chile	B.W. (AL)
280	T	Trelew, Argentina	B.W. (AL)
280	IR	Trevo, Brazil	B.W. (AL)
305	SER	Chile	B.W. (AL)
320	JPS	Brazil	B.W. (AL)
328	TAD	Trinidad, CO	G.H. (CA)
337	NA	Santa Ana, CA	G.H. (CA)
338	PBT	Red Bluff, CA	G.H. (CA)
339	RYN	Tucson, AZ	G.H. (CA)
344	FCH	Fresno, CA	G.H. (CA)
359	EMT	El Monte, CA	G.H. (CA)
378	CPM	Compton, CA	G.H. (CA)
397	SB	San Bernardino, CA	G.H. (CA)
404	MOG	Montague, CA	G.H. (CA)


EYA 357

BEACON KHZ

This will verify your Reception of our beacon

Date: November 19, 1998 B.K. Mullen

Freq: 357 KHZ Verified by:

Time: 0541 UTC SET JAX SSC

Elevation: 40 feet Title:

Power: 25 watts 11/24/98

Location: 30:26N 81:36W Date

Antenna Type: Remote Current

STATION STAMP

Jacksonville Remarks

Florida

QSL card for beacon EYA/357 kHz, Jacksonville, FL. (Courtesy Allen Renner-PA).

Not all beacons are elaborate affairs. Photo shows LLX/353 kHz located at a small airfield in Lyndonville, VT (Courtesy Dick Pearce-VT).

Your notes, loggings, QSLs and station photos are always welcome at Below 500 kHz. You can reach me by email using the address in the masthead, or by regular mail at Monitoring Times, 7540 Hwy. 64 West, Brasstown, NC 28902.

T.J. "Skip" Arey, N2EI
tjarey@monitoringtimes.com

Slinkys in the Sky

Let's turn the "Way Back" Machine to 1977. I am a newly minted Technician Class Amateur who carried forward his previous Novice privileges (a novel idea in itself at the time). I was the proud owner and builder of a Heathkit HW-8 and I was ready to burn up the airwaves. Well... warm them slightly anyway.

Operating QRP back in those heady days when you didn't hear an echo calling CQ in the Novice portions of 40 meters was quite a challenge to begin with. As I recall, the "school" position was that QRP operation was something for more experienced operators only. Novices need not apply. (Boy, were they wrong!)

I was saddled with an additional problem at that time. I was in a Graduate program, living in a dormitory with no hope of rigging up an outside antenna. My dorm room faced a parking lot where the nearest light pole was a good 75 feet away. The anal-retentive building manager would have caught even the thinnest wire strung over that distance.

But determination is at the heart and soul of even a budding young amateur radio enthusiast so I came up with a design that got me on the air. The Slinky™ antenna.

As best as I can determine, the use of Slinky children's toys as antennas was first proposed by Art Peterson W7CZB in the October 1974 issue of *QST*, in his article entitled *Apartment Dwellers' Slinky Jr. Ant.* In his design, Art made use of the smaller 1-3/4 inch "Junior" versions of this famous helical wire toy. His article is the basis of most of the thinking done about Slinky based antennas for years since.

Around the same year thast I was looking for antenna solutions for my dorm room, a company named Teletron Corp. marketed a commercial Slinky antenna. Their design was interesting in that they made use of helices that were a full 4 inches in diameter. To my knowledge, the actual Slinky toys were never made in that size. The Teletron antenna sold for $39.95 in 1977 dollars, or they would just sell you the two coils for $23.95 to allow you to "roll your own." (Quite literally, in this case).

Well, one nickel shy of forty bucks was a lot of money for a typically starving Grad student, so I did the next best thing and found some toy store items for about $1.50 each and went to work. What I had was the "standard" sized Slinky toy running 2-3/4 inches in diameter. The helix could be stretched out to between 10 and 12 feet without significantly distorting.

Sometimes ignorance truly is bliss. If I had had sufficient knowledge of inductance and resonant circuits at the time, I probably would have trashed the plan from the get go. Instead I charged ahead, making a doublet out of two standard Slinky toys. I ran one along one wall and the other at 90 degrees with a piece of coax running down from the corner to my operating (and studying) desk.

I had a rather novel way of adjusting the coils to calm the reading on my SWR meter. I would use clothes pins to clip sections of the coil windings together. I had a vague knowledge of antenna tuning units but I couldn't actually afford one, nor did I know how to build one at that point in my ham career. I made do with a bit of tweaking and a durable and forgiving Benton Harbor 2N4427 in the final of that old HW-8. I could get the thing to load and make a few contacts on the odd evenings when I was not in deep pursuit of some manner of esoteric knowledge.

Time passed... So did I. The Slinky toys got packed in a box as my new location allowed for a nice multiband dipole. I didn't give the design a great deal of thought after that until...

❖ Souping Up the Slinky

One evening a ham friend showed up on my doorstep with a couple of genuine Slinky toys and a copy of the original W7CZB article. I decided it might be fun to renew my acquaintance with my old dorm room doublet.

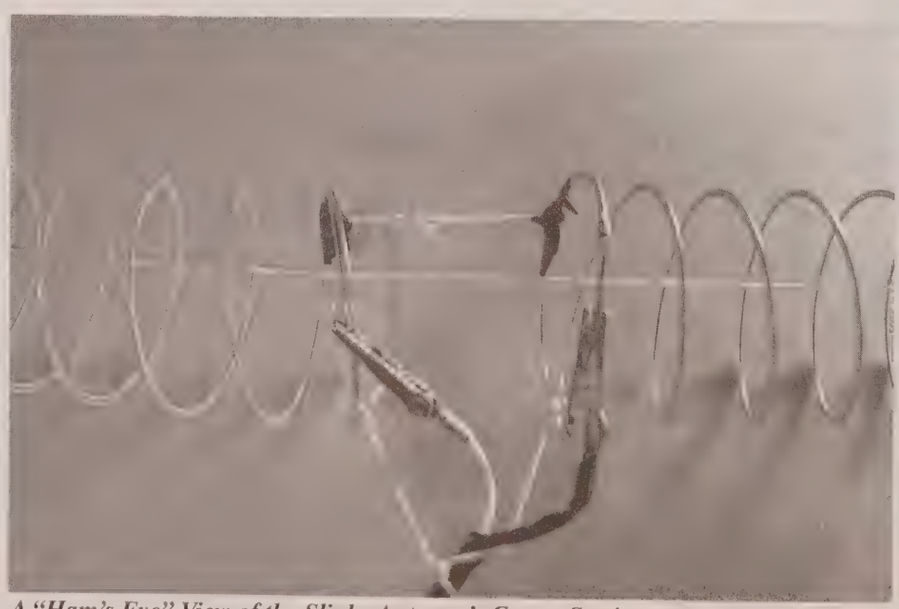
To begin with, the whole Slinky doublet design can be summed up in very few words:

- Take two equal diameter Slinky toys. (Check as well to see they have the same number of "turns.")
- Attach your feedline of choice in the middle as you would with any doublet design.
- Suspend the extended coils of the doublet with sturdy rope or other non-conductive material (W7CZB used wooden dowels).
- Adjust the antenna to resonance on the desired frequency by adding or subtracting an equal number of turns at the ends of the two legs of the doublet by means of drawing the unneeded coils together and shorting them out to one another.

That's about all there is to it. Just enough to make you dangerous! But allow me to unpack a few of the basic concepts a bit.

First, let's look at the feedline. The original W7CZB design used 300 Ohm TV twin lead. I used good, old-fashioned RG-58 way back in 1977 and my current experiments were conducted with RG-8X, mainly because I had a length of it lying around the shack. Now, as I understand feedline theory (and I am by no means an expert), all the advantages of a balanced feedline are dependent on the two radiating legs of the doublet being *exactly* the same length.

Well, let me tell you something, once you begin playing with this design I defy you to successfully adjust the two sides of the Slinky™ based doublet exactly. The spring action movement against the friction of the supporting surfaces and additional factors such as sag will make this nearly impossible. So my thinking is that, since I can't really balance the



A "Ham's Eye" View of the Slinky Antenna's Center Section

radiators I can live with an unbalanced feedline if I keep it relatively short and use good quality coax. That said, 300 Ohm TV twin lead is probably okay up to about 100 watts. Higher than that and you'll want to use "real" ladder line.

Some thoughts on the supporting material. Assuming you are using rope of some sort, the easiest way to get things to work is to run the rope through both Slinkys. In this way, the single rope supports the entire antenna structure. You can then tie it off to supports at either end and one in the middle if you intend to vary from a straight line. Hung in this manner, you still need to use short lengths of rope to tie the two legs of the doublet within an inch or so of each other at the center, as well as pulling the two coils out to their practical full length.

As to the Slinky toys themselves, as a general rule they will stretch out well to about 12 feet without a lot of distortion. Practically speaking, you should only pull them out to about 10 feet or so maximum to allow for adjustment of the coils as discussed.

A lot of folks have put thought into attaching the feedline over the years. Common practice has been to mechanically connect the feedline under the little metal crimps you find on the ends of the Slinky toys. This works great but, since I wanted to experiment with feedlines and such, I opted to use alligator clips. An example of how I accomplished this can be seen in the accompanying picture.

❖ Slinky Set-Up

Unless you have a great deal of patience, this antenna really requires a good antenna tuning unit to keep things right with your transmitter. ATU's do so much and expect so little in return. Further, regular checking and adjustment by way of said tuner is the order of the day. This is an antenna design that can be affected by a strong wind, especially when set up in a temporary location.

With the above caveat, I would go so far as to say that this design may be the perfect portable antenna setup. It can be erected in less than five minutes and its essentially adjustable physical length actually makes it a bit easier to hang than a full length dipole in many field configurations.

My 2001 version of the Slinky doublet was hung outside between two trees. As mentioned above, I went with RG-8X for the feedline. I figured that I would shoot for adjusting the doublet for the QRP area of 40 meters as a starting point. For me, this amounted to each leg of the doublet being stretched out to a wee bit short of 8 feet. From here I could tune a reasonable portion of 40 meters using the internal Antenna Tuning Units in both my Elecraft K1 and K2 transceivers. I was a happy puppy.

If I wanted to go into the higher frequency bands it was an easy matter to short out coils at the ends of the two Slinky toys. In this configuration the easiest way I could come up with to play on 80 meters would be to clip an equal length of hook-up wire to the outer end of each Slinky™ toy. If I wanted to consistently use 80 meters I might consider adding a second Slinky to each leg of the doublet. Joining two Slinky toys together is a simple matter of opening up the little metal clip at the end of the coil and using it to mechanically join the two coils.

This antenna design has a lot of possibilities for the traveler. After all, a hotel room is not all that different from a dorm room.

❖ Slinky Sales

There is one commercial entity still marketing a Slinky™ based antenna design. (Teletron is apparently no longer in business.) The QRV Helitrix Indoor Antenna is sold by Antennas & More, PO Box 51591 Provo, UT 84605 (801) 362-5370 **http://www.antennasmore.com/**. Their Helitrix 40-10 meter antenna sells for $35.00 and they also market an 80 meter Extension Kit for $10.00

There are a lot of additional possibilities for the Slinky ™ based design. I believe the original W7CZB antenna used two Slinky toys on each leg of his doublet to allow his antenna to work well down into the 80 meter band. Another possibility would be that any number of Slinkys could be joined end to end to make a random wire (helix?) configuration. The use of multiple Slinkys is essentially only limited by the carrying ability of the rope, doweling, or PVC pipe used to support the helices.

Experiment and have fun! Who knows what you might come up with? I can only make one unequivocal statement about this antenna design... The *plastic* Slinky™ toys just don't work well at all! I'll see you on the bottom end of 40 meters.

UNCLE SKIP'S CONTEST CORNER

ARRL International DX Contest (Phone)
0000 UTC, Mar 1 - 2400 UTC, Mar 2

RSGB Commonwealth Contest (CW)
1000 UTC, Mar 8 - 1000 UTC, Mar 9

Wisconsin QSO Party 1800 UTC
Mar 9 - 0100 UTC, Mar 10

Virginia QSO Party 1800 UTC
Mar 15 - 0200 UTC, Mar 17

Spring QRP Homebrewer Sprint
0000 UTC, - Mar 24 0400 UTC, Mar 24

CQ WW WPX Contest (SSB)
0000 UTC, Mar 29 - 2400 UTC, Mar 30

Longwave Resources

✓ **Sounds of Longwave** 60-minute Audio Cassette featuring WWVB, Omega, Whistlers, Beacons, European Broadcasters, and more! $11.95 postpaid

✓ **The BeaconFinder** A 65-page guide listing Frequency, ID and Location for hundreds of LF beacons and utility stations. Covers 0-530 kHz. $11.95 postpaid

Kevin Carey
P.O. Box 56, W. Bloomfield, NY 14585

Outer Limits continued from page 69

medium wave station in North East, PA, but they add comedy and coverage of the pirate radio scene. (Providence)

WLIS- Jack Boggan's veteran pirate is the only station on shortwave where the programming consists mainly of interval signal tuning songs used by licensed shortwave broadcasters. Jack plays the interval signals as hit tunes. (Blue Ridge Summit)

WMFQ- The purpose of this station is advocacy for QSLs. Their IDs are always delivered in an obscene fashion by a chanting male chorus. (Providence)

WMOE- Novelty and parody music is their normal fare, along with audio clips from the Three Stooges. (Uses *wmoe6955@yahoo.com* e-mail)

WMPR- Their Amicropower radio@ slogan still accounts for their call letters. Normally they play techno Adance party@ rock music, but around the holidays they played seasonal tunes. (Still none; occasionally verifies loggings in pirate DX bulletins)

WRAS- Not much is known yet about this new rock music station. (Gives a hotmail.com e-mail address that is not yet confirmed)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 28413, PO Box 68022; Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 293, Merlin, Ontario N0P 1W0, Canada, and PO Box 69, Elkhorn, NE.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for sending pirate loggings remain *The ACE* ($2 US for sample copies via the Belfast address above) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via **niel@ican.net**. The Free Radio Network web site, another outstanding source of content about pirate radio, is found at **http://www.frn.net** on the internet.

❖ Thanks

Your loggings and news are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Lee Banner, Fishkill NY; Jerry Berg, Lexington, MA; Artie Bigley, Columbus, OH; Ross Comeau, Andover, MA; Rich D'Angelo, Wyomissing, PA; Harold Frodge, Midland, MI; Nick Grace, Washington, DC; William Hassig, Mount Prospect, IL; Ed Kusalik, Coaldale, Alberta; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Tim Lemmon, Atlanta, GA; Bill McClintock, Wellington, OH; Cachito Mamani, Santiago, Chile; Mark Morgan, Cincinnati, OH; Adrian Peterson, Indianapolis, IN; Craig Pradarelli, Milwaukee, WI; Mike Prindle, New Suffolk, NY; Lee Reynolds, Lempster, NH; Robert Ross, London, Ontario; Martin Schoech, Merseburg, Germany; Ed Walsh,Birmingham, AL; and Niel Wolfish, Toronto, Ontario.

Clem Small, KR6A
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Beam Antennas: What, Why and How

In our discussion this month, we'll be talking about how antennas distribute their energy into space. A graph of this distribution is called the antenna's "radiation pattern"(e.g.,fig. 1A & D). Fortunately, an antenna's reception pattern is the same as its radiation pattern, so keep in mind that in describing either pattern we describe both.

❖ Directional and Non-Directional Antennas

Antennas are never completely nondirectional. For instance, a grounded, vertical, quarterwave antenna is known as a "nondirectional antenna." It is relatively nondirectional in the horizontal plane (fig. 1A). But it has essentially no radiation straight up and has varying levels of radiation strength at different vertical angles (fig. 1A). So, although it is relatively nondirectional in the horizontal plane, this antenna is directional in the vertical plane.

In contrast to nondirectional antennas, there are a number of directional-antenna designs called "beams"(1D). Usually a beam antenna's pattern has one or two major lobes (enlargements indicating directions of higher gain), and a few minor lobes (smaller lobes indicating lower gain). There are also indentations (nulls) in the pattern indicating very low gain.

❖ Making Antennas Directional

There are various ways of making antennas directional. For instance, simply stringing a wire antenna in a straight line for one or more wavelengths will create what is called a "long-wire" beam. Such long-wire elements are used in various combinations to create the legendary, old-time V beams, and rhombic beams. These beams supported much of the early transoceanic wireless communication in radio's early days.

Phased-arrays are beams which utilize multiple elements fed with a signal which is divided between the elements, and its arrival at each element is timed such that interaction of the radiation from the various elements shapes the beam's pattern. Examples of phased-array beams include the coaxial Franklin, and the in-line broadside and in-line end-fire arrays.

Parasitic beams utilize the fact that an antenna element re-radiates part of the RF energy which it receives from space. Parasitic elements are located near the beam's driven element (the only element connected to the antenna's feedline), and receive some of the RF energy emitted from that element. The parasitic elements then re-radiate some of the energy such that it combines with radiation from the antenna's other elements to form the desired lobes and nulls in the antenna's pattern. Examples of parasitic beams are the Yagi-Uda and cubical quad.

Some beam antennas utilize a reflector made of conductive material to redirect energy in the desired direction of radiation. Reflector antennas may utilize flat metal sheets or meshes, as with the bedspring and corner-reflector antennas, or metal dishes as with parabolic reflector antennas. Because the earth is conductive, it is utilized as a reflector in many antenna designs. Varying the antenna's height above ground can control the orientation of the antenna's major vertical lobes. Examples include the horizontal dipole at 1/2 wavelength above earth to emphasize low, vertical-angle radiation for DX, and the same antenna at 1/4 wavelength height to emphasize high, vertical-angle radiation for NVIS (near vertical incidence skywave).

Beams can utilize dielectric (insulating) material or metal vanes as a lens to focus signals to a beam as they launch from a waveguide.

Many different directive antenna designs have been developed over the past century, but most of them are variations on the basic ideas covered above.

❖ Why Use a Directive Antenna?

For reception, an antenna must produce sufficient signal strength for good reception of the desired signal. For this, the desired signal must be strong enough to be heard above the received-noise, received-interference, and internally-generated receiver noise. Below about 20 to 30 MHz there is typically significant received noise and interference. As explained below in the answer to last month's Radio Riddle, simply increasing antenna gain at these frequencies will increase the strength of the received noise and interference just as it increases the desired signal's strength. This doesn't improve quality of reception.

However, it is possible to avoid some noise and interference with an appropriately-shaped antenna reception pattern. If you change from a nondirectional antenna to one with a reception pattern that emphasizes reception in the desired direction, and de-emphasizes reception in other directions, then less noise and interference will be received.

Above 20 to 30 MHz or so, there is much less received noise, and so internally-generated receiver noise becomes the major noise to consider. Interference rejection can still be important at these frequencies, and even noise rejection at times, but these are not usually the major consideration they are at lower frequencies. At these higher frequencies, beams, with their high gain levels, are often used just to increase the desired signal's strength above the receiver's internally-generated noise.

For transmitting antennas the goal is different from those for receiving antennas, regardless of frequency range. The goal here is usually to get the maximum signal from the transmitting antenna to the antenna of the distant receiver without causing undue interference to other communications. For broadcasting, a radiation pattern that covers the listening audience well is the main goal. Often this requires a nondirectional antenna. For directional communications, the strength of the signal

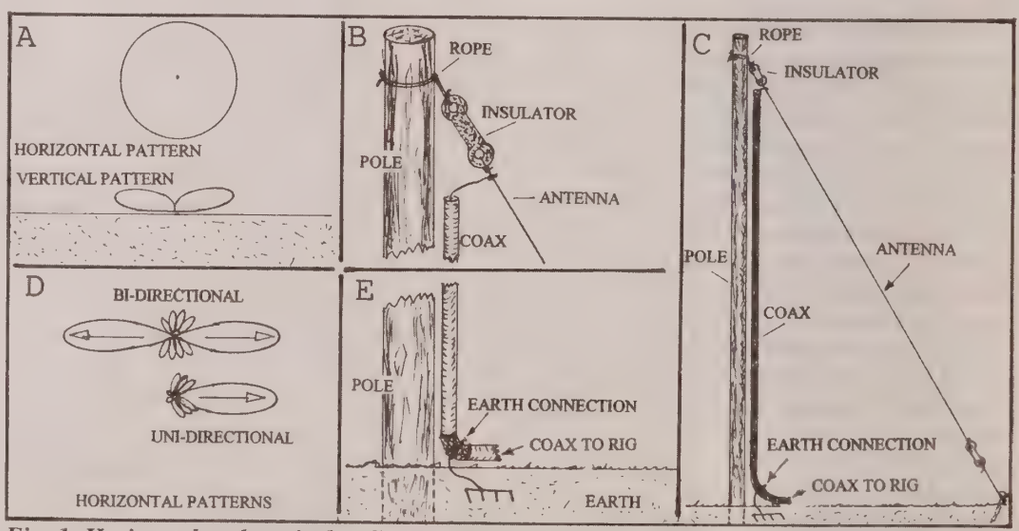

Fig. 1. Horizontal and vertical radiation patterns for a quarterwave, ground-mounted, vertical antenna (A), top detail for the sloper (B), a quarterwave sloper antenna (C), radiation patterns for some highly directional beam antennas (D), bottom detail for the sloper.

This Month's Interesting Antenna-Related Web site:

More sloper plans and info at http://www.hard-core-dx.com/nordicdx/antenna/wire/sloper.html
Or try this U. S. Navy site for 276 pages (WOW!) of information on the basics of antennas and propagation. https://www.advancement.cnet.navy.mil/products/web-pdf/tramans/bookchunks/14182_fm.pdf

in the direction of the antenna's main lobes is the primary concern. The antenna pattern's nulls and minor lobes are of interest for preventing the transmitter's signals from causing undue interference to communications in other directions.

Vertical-angle directivity is important, too. As mentioned above, vertical angle of radiation is a key factor in using HF or MF ionospheric skip for close-in, or for DX work. On VHF and higher frequencies, low vertical angles are used to get the signal out to the horizon, whereas higher vertical angles support earth-to-space, and ground-to-air communications.

❖ Let's Make a Beam

The sloper beam is simple to make, modestly directive, relatively inexpensive, and it gives good results. A single sloper can be built oriented to emphasize signals from a specific direction. Or you can orient the antenna to reduce noise and interference from its non-favored direction. You can also mount several slopers spaced around the same pole or tower such that switching between them gives a choice of directivity.

To make a 1/4 wavelength sloper as shown in fig. 1C, first obtain a tower, pole or other mount. Using one of the equations below, cut the beam's element to length for your favorite frequency, or for the middle of your favorite band. If you have an SWR analyzer or other means of determining antenna resonance, then cut the element about 10 percent long, and trim it to resonance once it is installed.

Length (in ft)= 234/freq. in MHz,
or
Length (in meters) = 71.3/freq. in MHz

For instance, for 10 MHz, the element length would be 7.13 m, or 23.4 ft.

The high end of the element is attached to the coax center connector, and to an insulator (fig. 1B). If the mounting is not conductive material (such as a metal tower or metal pole) the outer conductor connects to nothing. Otherwise, connect the outer conductor to the mount about 1/4 wavelength above ground, or as close to that height as practical. Run the element away from the mount in the direction from which you want to receive best. Seal the coax end against weather with coax sealer.

If the mount is non-conductive, then trim a bit of insulation from the coax at the bottom of the mount, and connect the coax outer conductor to a ground connection (fig. 1E). Seal the opening to the coax where the ground wire is attached. Run the coax underground, or on the ground away from the antenna.

If you live where lightning is at all likely, don't forget protection from lightning-induced damage. The minimum is never use the antenna during bad weather, and disconnecting and grounding the lead-in when the antenna is not in use.

RADIO RIDDLES

Last Month:

I said: "On the VHF bands, and particularly the UHF bands, we can hear experienced operators say that every single dB of gain they can get from their antenna is important. On the other hand, we don't often hear that about antennas on the HF bands. Why?"

Well, on HF and lower frequencies, received noise is typically so much stronger than internally-generated receiver noise that received noise essentially determines the "N" of the signal-to-noise ratio (S/N). Consider that the S/N must be high (signal strong compared to noise) for good reception. Consider also that each dB of antenna gain increases the relatively-high received-noise level just as it increases the received-signal level. So increasing antenna gain doesn't improve the S/N, and reception quality isn't improved.

On frequencies above HF there is typically so much less received noise that internally-generated noise, rather than received noise, now essentially determines the level of "N" in the S/N. So, because received noise effects the S/N relatively little, each dB of signal gained by the antenna goes to increase the S/N. This does improve quality of reception.

This Month:

For point-to-point communications, is it ever possible to have too much gain or directivity?

You'll find another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

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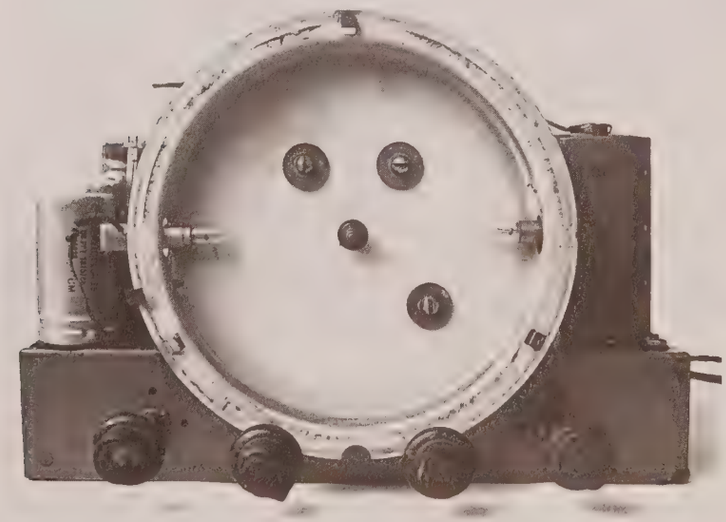
Aligning the Zenith 6S229

During last month's installment of this column, we pieced together the mechanical puzzle that the Zenith's dial drive mechanism had become, and were gratified to see the tuning capacitor responding smoothly to the motion of the tuning knob. That brought us to the point where we could power up the radio and – fingers crossed – we turned it on. Amazingly, considering the neglect and cannibalization that this set has been subjected to, it worked and we could pick up stations all over the broadcast band and in a few places on the shortwave bands.

❖ Reinstalling the Dial Pan

The next order of business would be to realign the radio according to the original specifications as published in *Rider's Manuals*. But before that could be done, the dial indicator assembly had to be reassembled. The assembly consists of a heavy metal pan equipped with clips to hold the translucent dial scale in front of it. The light-colored interior of the pan is illuminated by two dial lights. The fixtures for these lights slide onto a pair of tabs mounted on either side of the pan – with the bulbs passing through the holes provided.

The pan is screwed to the front of the tuning capacitor using three threaded holes in the capacitor frame. Inch-and-a-half spacers slid over the backs of the screws position the pan correctly in front of the tuning capacitor. One of these spacers was missing and, as the radio was received, the screw had been installed without it. Another case of parts cannibalization, I assume. My junk box yielded a spacer that was almost long enough and I made up the difference with a thick washer. Now the pan could be firmly installed at the correct distance from the capacitor.



Replacement of missing spacer allowed firm reattachment of dial pan to front of tuning capacitor. Missing dial light fixture and lamp were also replaced.

Next I installed the one dial light assembly that had remained with the set and searched the junk box for a replacement for the second one. I quickly found one with the identical clip-on fixture and also turned up a proper matching dial light bulb.

A few words about dial lamp nomenclature are probably in order here. The most common dial lamp for a set with 6.3-volt tubes, such as this one, has a tiny brown bead at the base of its filament. This signifies that the lamp is designed to operate at 6.3 volts at .015 amperes.

The lamp may have a bayonet base (as in this case) or a screw base. The former is known as a type 47; the latter as a type 40. Bayonet-base lamps will probably have their type number stencilled on the base. The type 47 lamp is also commonly used in a.c.-d.c. radios, where it operates from a pilot light tap on the rectifier tube filament.

I had to do a bit of head-scratching when my replacement dial light fixture didn't light up, even though the lamp had tested good. Taking a closer look, I saw that, even though the new fixture was virtually identical to the old one, it had a separate solder lug to make connection with the lamp's base shell. In the original fixture the shell was grounded through the mounting bracket. The problem was quickly connected by soldering a jumper from the solder lug to the mounting bracket of the new fixture.

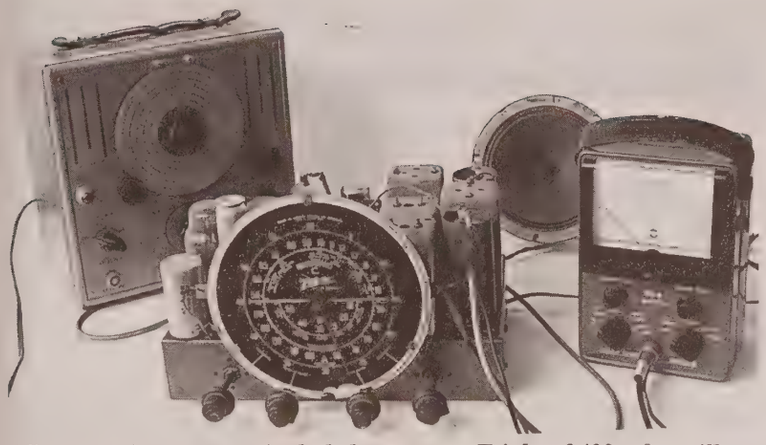
Using "automotive goop" (see text), I was able to force the warped dial scale into a flat position on the dial pan.

❖ Straightening Out the Dial Scale

The next problem was the installation of the translucent plastic dial scale. It was a bit of a challenge. Take a look at last November's column to see what it looked like as received. It wasn't really installed at that time – just hanging loose on the pointer shaft (backwards at that), held in place only by the pointer. Moreover, it was warped and buckled in a couple of different directions and even cracked in one place. As I've already said recently, I'm pretty sure that the scale originally installed on this radio is now on another 6S229 and this one is the reject from that set.

Reproduction dial scales are available for many Zenith "black dial" radios, including this one – but I decided to see what I could do to save the scale I had. I slipped it under the mounting tabs on the dial pan, flattened it with my hand, and firmly closed each tab with a needle-nose plier. The scale was now held in a somewhat flatter position, but it still bulged in many places along the circumference. The dial pointers would never travel over it without rubbing. I needed more attachment points!

To solve the problem, I turned to product known as "Automotive Goop." It's gen-



Alignment instruments included my trusty Triplett 2432 r.f. oscillator and RCA Voltohmyst Jr. VTVM – both of which were rehabbed in previous "Radio Restorations" columns.

erally available in auto supply stores. "Goop" is a heavy-duty contact adhesive sold in a tube. It's used like any contact cement; one coats both surfaces to be joined with a layer of it, waits a few minutes for the product to cure, then presses the surfaces together for an instantaneous bond. I applied the adhesive at several different spots where the dial scale was bulging out along its circumference – joining the scale to the dial pan at each spot.

The product worked very well, although I found that results were better if I clamped together the spots to be joined rather than relying on an instantaneous bond. A few minutes under the clamp was enough to do the job. I also made sure to "Goop" the scale on both sides of the crack to minimize that little defect.

The result was a very convincingly flat dial scale, and a very gratifying sight it was! Now I could install the two pointers and get along with the alignment.

The pointers slipped onto their shafts without incident and did not rub anywhere on the surface of the now-flat dial scale. However, I did have to bend them judiciously, here and there, to keep the pointers from interfering with each other. I also adjusted the frequency-indicating pointer (as opposed to the red "split-second" vernier pointer) so that it covered the broadcast band (as well as the two shortwave bands) with the same amount of overtravel at each end.

❖ Setting up For Alignment

Now that the dial was completely operational, I was in a position to begin the alignment. The instruments I chose for the job were a Triplett 2432 r.f. oscillator and an RCA Voltohmyst Jr. VTVM – both of which had been rehabbed in earlier columns in this series. The 2432 would generate the various modulated test signals specified by Zenith (as outlined in *Rider's Volume VIII*) for the various stages of the alignment process; the Voltohmyst would indicate the strength of the test signal as output by the receiver so the signal could be maximized during each of the adjustments.

During previous alignments undertaken for this column, I used a low-sensitivity VOM as an output indicator and, therefore, had to connect it directly to the plate of the audio output tube (through a capacitor) to get a strong indication on the meter. Now, using the much more sensitive VTVM, I didn't have to go inside the radio to make the connection – I could connect directly to the speaker voice coil terminals and still get a decent indication in spite of the much lower a.c. voltage there.

Though I've brought it up during earlier alignments, I'll remind you again that it's necessary to work with as low-level a test signal as possible – especially when aligning the i.f. amplifier – to avoid triggering the radio's automatic volume control. Otherwise, the action of the AVC will tend to flatten the output peaks we are trying to observe during the various adjustments.

Another issue in the alignment is the use of a "dummy antenna." This radio does not have an internal loop antenna as later sets do, but was designed to operate from an external antenna – either a classic outside sky wire run, perhaps, from the house to a tree or maybe just a long length of wire run under a rug. Since the antenna is not normally connected during servicing, a substitute needs to be wired across the antenna and ground terminals to simulate its presence.

The dummy antenna required for various alignment operations is specified in the manufacturer's alignment data. Zenith asks for a 0.5 ufd capacitor across the antenna input during i.f. alignment, switching to a 200 pf capacitor for all broadcast-band oscillator adjustments. When making oscillator adjustments for the two short-wave bands, a 400-ohm resistor is used instead.

I was able to find a resistor of the correct value and relied on a couple of decade capacitor boxes I had on hand to provide the two capacitance values.

❖ Carrying out the Alignment

Like all alignments, this one began with a tweaking of the i.f. channel. With the .5 ufd dummy antenna connected, the signal generator was set to the i.f. frequency (456 kHz) and injected into the control grid of the 6A8 oscillator-mixer tube as specified. With the set's volume control turned up near maximum and the test oscillator output just high enough to get a readable output on the meter, I began adjusting the trimmers on the i.f. transformer cans, working from the audio end of the set back towards the r.f. end as is the practice.

The transformers were very much out of tune, with each successive adjustment making a huge increase in output – enough so that I had to drastically reduce the output of the test oscillator after each "tweak." This is very common in broadcast receivers that have been stored for decades and was entirely expected.

The remaining adjustments involved the oscillator circuits that controlled the calibration of the dial and – in the case of the broadcast band – the proper "tracking" (maintenance of calibration) across the dial. Switching to the 200 pf dummy antenna, I connected the test oscillator output to the receiver antenna post as specified – then adjusted the required trimmers to make the test oscillator appear at the proper spot on the dial at 1500 and 600 kHz. Virtually no adjustment was required at 1500 kHz, but the 600 kHz signal was coming in about 100 kHz high and I really had to crank on the trimmer to bring it down to the right spot.

Now changing to the 400-ohm dummy antenna, I checked the calibration of the two shortwave bands at 18,000; 16,500 and 5,500 kHz as specified. The first two frequencies were virtually spot on; the last one required a bit of trimmer cranking to bring it down to the correct point on the dial.

Without a doubt, the readjustment of the i.f. channels resulted in a very significant improvement in performance even on the short shop antenna. In the next column, I hope to give you a more formal performance check using an outside antenna.

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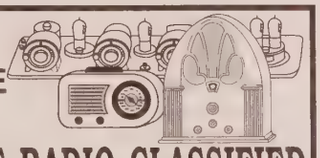

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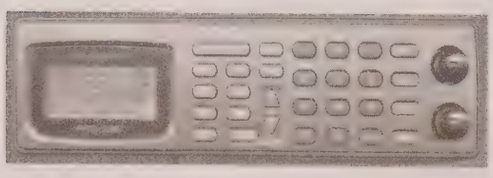
Tk92 Software for the PRO-92/2067

The portable PRO-92 and mobile PRO-2067 were among the first trunk tracking scanners made for Radio Shack by GRE (General Research of Electronics). The PRO-92 and PRO-2067 were priced at a whopping $349.99 when we reviewed them in January and September 2000 *MT*.

As Radio Shack replaced both with newer models, prices were quietly slashed to under $150 each (December 2002). As word of the reduced prices spread over the Internet, hobbyists rushed to their local Radio Shack stores in search of these models, now in short supply.

The PRO-92 and PRO-2067 have some attractive features not found in later models. They are the only multi-system trunking scanners offered by Radio Shack thus far. "Multi-system trunking" is the company's term for scanners which can track conversations not only on Motorola and EDACS systems, but on LTR systems, as well.

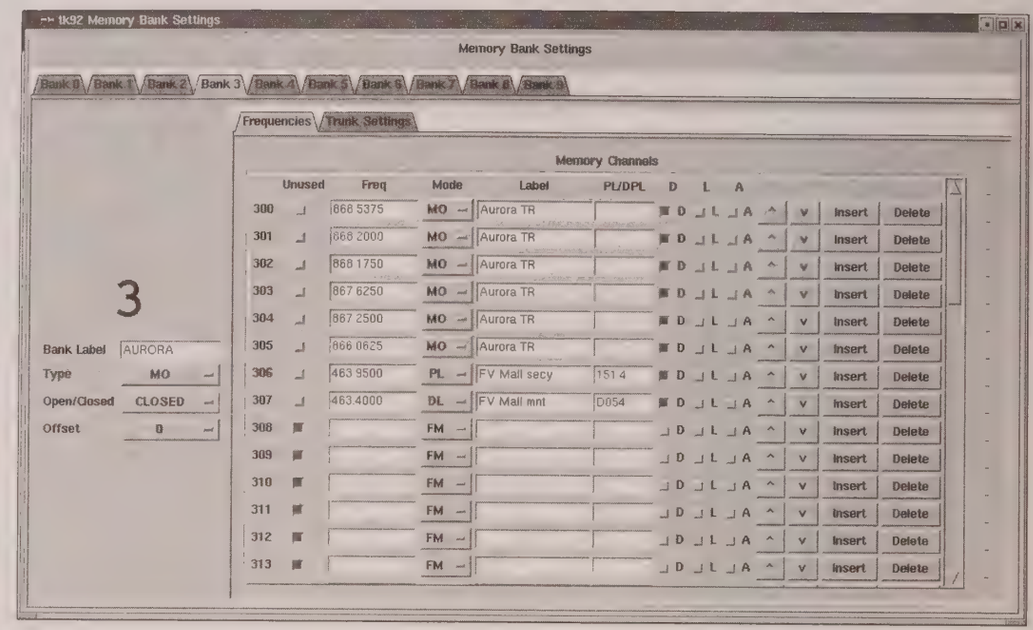


The radios have PL (CTCSS) and DPL squelch as well as a unique ability to display the PL and DPL codes almost instantaneously, unlike Uniden and ICOM receivers which search slowly through all the tone combinations until they find a match. The newer dual-trunking PRO-2053, PRO-93, and PRO-95 support neither LTR nor PL/DPL decoding and display.

The 500-channel PRO-92 and PRO-2067 have identical features and use the same software for cloning by a computer. Their settings may be copied directly from one radio to the other using the simple, 2-conductor cable, which is packed with each radio.

❖ Early PRO-92 Software Experimenters

Ken Plotkin used the Fortran language to write **92ware**, probably the first PRO-92 cloning freeware (**http://members.cox.net/kplotkin**). Ken and Bill Petrowsky (**http://members.ulster.net/~petrow**) worked out the protocol required to communicate with the PRO-92 using a computer. More challenging, they discovered and published a map of the PRO-92's internal memory image, i.e., how its settings are stored.


tk92 Memory Bank Settings
Memory Bank Settings
Bank 0 Bank 1 Bank 2 Bank 3 Bank 4 Bank 5 Bank 6 Bank 7 Bank 8 Bank 9
Frequencies Trunk Settings
Memory Channels
3
Bank Label AURORA
Type MO
Open/Closed CLOSED
Offset 0
Unused Freq Mode Label PL/DPL D L A
300 866.5375 MO Aurora TR
301 866.2000 MO Aurora TR
302 868.1750 MO Aurora TR
303 867.6250 MO Aurora TR
304 867.2500 MO Aurora TR
305 866.0625 MO Aurora TR
306 463.9500 PL FV Mall secy 151.4
307 463.4000 DL FV Mall mnt D054
308 FM
309 FM
310 FM
311 FM
312 FM
313 FM
Insert Delete

Ken wrote "Creating this stuff was quite an experience. I know very little about scanning (99% of my scanner use is at auto races) and Bill was not a programmer. The collaboration was thoroughly enjoyable."

Steve Falco translated Ken's 92ware into the C language and ported it to run on Linux. Both programs are invoked on the command line and lack a graphical interface.

Don Starr wrote **Win92**, a free, closed source, graphic PRO-92 cloning program. Win92 requires Microsoft Windows. Later, Don used Win92 as the basis for Win93 and Win95 software, which he makes available for free download at **http://www.starrsoft.com**.

❖ Tk92 Software

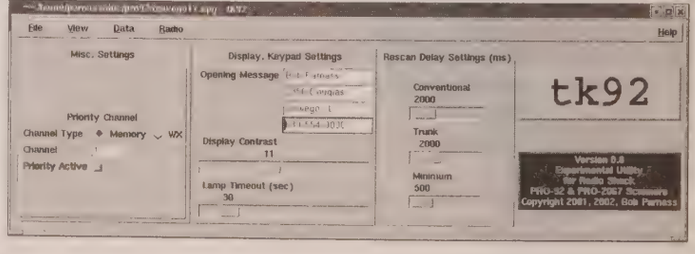
If your computer runs Microsoft Windows, you can use the Win92 graphical software described previously. What if you don't use Windows? I wrote tk92 chiefly for radio hobbyists who use Linux, MacOS X, BSD, Solaris, Unix, or other non-Windows operating system. Tk92 works on Windows-based systems (95 and later), too.

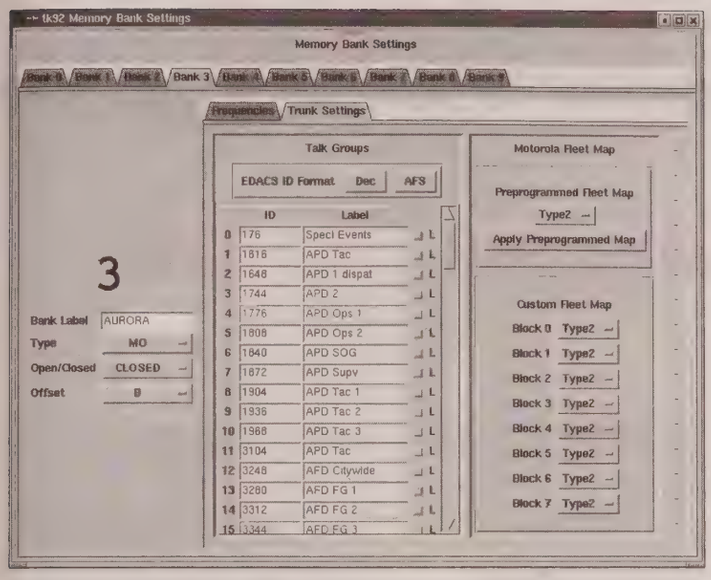
Tk92 is open source and there are no secrets within. You can see how the program is written and make changes if you want.

Tk92 lets you change the PRO-92's search limits and settings, opening message, and priority channel. You can alter other settings which are not normally accessible through the radio's keypad. For instance, tk92 lets you adjust the back light timeout and reprogram the weather frequencies and labels. (You could search 10 DEA frequencies by pressing the WX key, for example.) The rescan delay length is adjustable via software, as well.

There are two ways to change memory channels. One way is to make changes to memory channels within tk92, and that is a departure from the tk radio software described in previous columns. Memory channels may be sorted by frequency or label, deleted, inserted, or exchanged with an adjacent channel. Pairs of complete memory banks may be swapped.

There's another way to alter memory channels; you export them to a csv (comma-sepa-





rated values) file, then use a spreadsheet or text editor program to make the alterations. Then, you import the updated csv file into tk92 and write the information to your radio.

Tk92 permits editing of talk group IDs, both within the program and by export/import of csv files. EDACS talk group IDs may be in either decimal or AFS (agency fleet subfleet) format.

Fleet maps may be configured for Motorola Type I or hybrid trunked systems.

❖ Cloning Cable

You will need a suitable TTL-to-RS232 level adapter to connect the radio to your computer serial port. A direct cable connection won't work and could damage the radio and/or computer serial port hardware.

I use a miniature stereo-to-mono adapter with an RT Systems CT29A cable, sold for the VR-500. The RT Systems web site is **http://rtsars.com** and the sales staff may be contacted at telephone 678-354-3500 or *sales@cloningsoftware.com*.

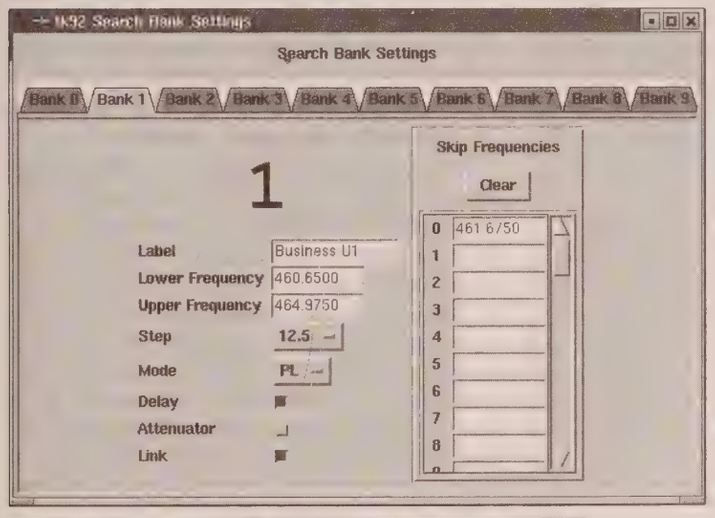
Tk92 is compatible with other commercial cables, including the original GRE 30-2290 cable and the "Purple" cloning cable (labeled with US Patent 5,504,864) available from Purple Computing (**http://pfranc.com/pclink/ScannerDeal.shtml**) and BlackBag Software (**http://pro92.com**). It also works with home-made cloning circuits, e.g., Bill Petrowsky's Simplified Op Amp cable and 2-transistor cable. Cables which are self-powered have a better chance of being compatible than those which draw power from serial port.

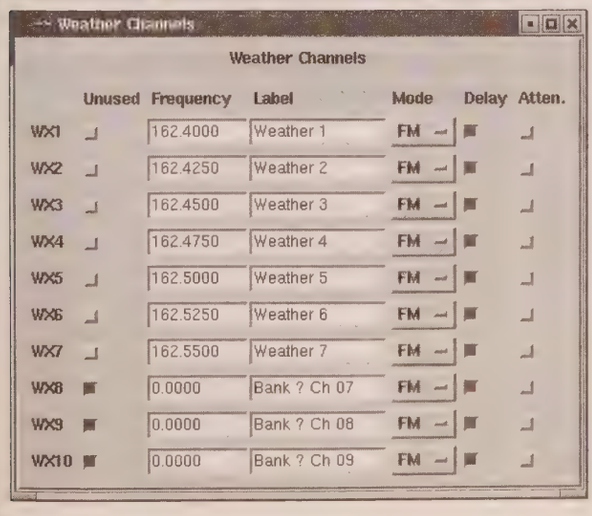
❖ Getting Tk92

Tk92 is distributed free of charge, but it is neither shareware nor in the public domain. It is a copyrighted work released under the terms of the GNU General Public License as published by the Free Software Foundation.

Tk92 runs best if your computer has at least 256 MB of RAM. You can view screen snapshots and download tk92 freely from the **http://parnass.com** web site.

There is no tk92 instruction manual or user documentation beyond a "readme" file and the information available at the web site. The software is fairly simple to use. Balloon help windows are provided for many fields. If you want more information about a field, hold the mouse cursor over the field for a few seconds and a small, yellow window will appear, containing helpful hints.




Weather Channels
Weather Channels
Unused Frequency Label Mode Delay Atten.
WX1 162.4000 Weather 1 FM
WX2 162.4250 Weather 2 FM
WX3 162.4500 Weather 3 FM
WX4 162.4750 Weather 4 FM
WX5 162.5000 Weather 5 FM
WX6 162.5250 Weather 6 FM
WX7 162.5500 Weather 7 FM
WX8 0.0000 Bank ? Ch 07 FM
WX9 0.0000 Bank ? Ch 08 FM
WX10 0.0000 Bank ? Ch 09 FM

❖ Acknowledgements

Thanks to Ken Plotkin and Bill Petrowsky for publishing the PRO-92 and PRO-2067 memory image layout, with corrections from Don Starr. Don, Ken, and Bill were helpful in suggesting changes to tk92 to permit it to function with a wider variety of cloning cables. Bill suggested implementing preprogrammed fleet maps in Win92 and I incorporated them into tk92, as well. Steve Falco published the C source code for his 92linux software, which I studied to gain further insight into data transmission between radio and computer.

Thanks also to Greg Shepherd, Ryan Schave, Frank Monroe, Bill Petrowsky, and others for helping to test tk92 and for their words of encouragement.

❖ ICOM IC-R3 UHF Interference

I reviewed the ICOM IC-R3 portable scanner/TV in October 2000 *MT* and described tk3 free software for it in February 2002 *MT*.

Charlie Thompson, W5CDT, reports that a strong local signal transmitting on 454.150 MHz interferes with his ICOM IC-R3's UHF reception.

Charlie says, "What's magic about 454.150 is that it is two times the 1st IF (240.1 MHz) away from the 2nd IF (26.05MHz)... the radio is quite sensitive to 454.150 (like -80dBm) every 20 kHz up and down the band..." If Charlie listens to UHF and a station transmits on 454.150 MHz in his area, his IC-R3 receives interference every 20 kHz.

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John Catalano, PhD
johncatalano@monitoringtimes.com

Now That's DX! Monitoring Planet Jupiter

Some people may say that the latest models of computers are simply out of this world. Over the next two columns we will learn how to use our radios and computers to eavesdrop on transmissions actually originating from "out of this world." The largest planet in our solar system, Jupiter, is a prolific source of naturally occurring radio emissions.

We'll look at Jupiter in an astronomical sense: Where does it sit relative to Earth and the Sun? Then with a very little bit of physics, we'll see how Jupiter is transmitting these radio signals and on what shortwave frequencies. Next – and here is where the computers come in – we will look at a program that will make predictions of when Jupiter's radio emissions are most likely to be heard from a given position on Earth.

As radio monitors, we will look at what radio equipment, receiver settings, and antenna is needed to "listen" to the planet Jupiter. Finally, a second computer program takes the audio output of our receiver, and captures, displays and stores the results on a computer.

If you have a shortwave receiver, some wire and a computer, you already have all the equipment for "Jupiter listening." Now let's get the missing ingredient: know-how.

❖ Getting to Know Jupiter

Named after the major Greek God, Jupiter lives up to its name. As the fifth planet from the Sun (the Earth being the third planet) it is over 10 times the diameter of Earth and has a mass (amount of material) more than twice that of all the other planets in our solar system added together! Heavy, man. All this mass carries along with it a correspondingly huge gravitational field.

Astronomers have been looking at Jupiter for hundreds of years and watching its huge red spot, which appears to move over the surface. The spot is so large that it could easily swallow up an Earth or two.

From spacecraft flybys we now know that the red spot is a hurricane-like disturbance in Jupiter's atmosphere. Also from recent studies, including fly-bys, we have determined that Jupiter's composition is very star-like, being primarily composed of hydrogen (88%), with helium and other basic gases composing the remaining 12%. It is this over-abundance of hydrogen that may give Jupiter its radio transmission capabilities.

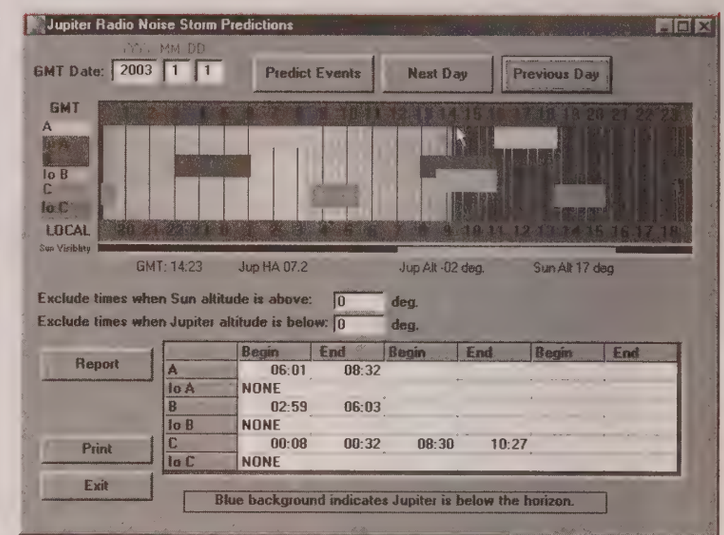

Figure 2 Daily Noise Storm Prediction Screen

❖ A Radio Pressure Cooker

Jupiter's core is theorized be composed of hydrogen under great temperature and pressure. These conditions change the state of hydrogen from a gas to a liquid. Finally, as a result of the relentless huge pressures and resulting energetic environment, electrons are stripped from the hydrogen atoms. No longer bound to the hydrogen nucleus, they are free to "roam." This makes the hydrogen conductive and metal-like in its electrical and magnetic properties. You wouldn't find this stuff in your refrigerator.

With all this energy at its core, and its huge gravitational field, it is little wonder that Jupiter gives off lots of energy in an effort to "cool down." This huge energy release spans the spectrum from heat to radio waves to x-rays. When the *Voyager* spacecraft measured the X-ray being emitted near Jupiter, its instruments were almost fried by the X-ray emissions! Added to these energy emissions are the enhancing electrical effects that the "metallic hydrogen" core has on the spinning planet's intrinsic magnetic field.

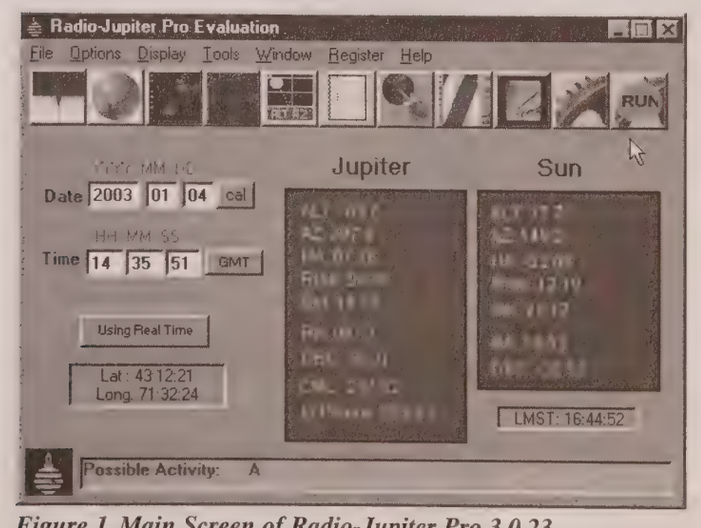

Figure 1 Main Screen of Radio-Jupiter Pro 3.0.23

❖ Uh Oh! It's Io!

Unlike Earth, Jupiter has a number of moons. Many are so large that they are visible from earth using simple amateur telescopes. One of these moons is named Io. Spacecraft have sent back close-up pictures of the surface of Io showing erupting volcanoes and twisted, distorted features. Being in the close proximity of Jupiter, Io's core material is being pulled out by the Jupiter's huge gravitational field, resulting in these violent and frequent eruptions. In turn, the material from the eruptions is sucked into the intense magnetic field of Jupiter. This energetic material hits Jupiter's atmosphere and stimulates the gases to emit bursts of energy in the radio spectrum.

❖ Jupiter Calling

The complex interactions between Io and Jupiter result in a number of radio emission modes. Having access to a shortwave receiver, I was most interested in emissions that lie in a frequency band from 15 MHz to 39 MHz. International agreements have set aside 25.55 to 25.67 MHz as quiet zones for radio astronomy, so this is a good place to start. However, any frequency from 20 to 30 MHz that does not suffer from man-made terrestrial interference will work. We'll talk more

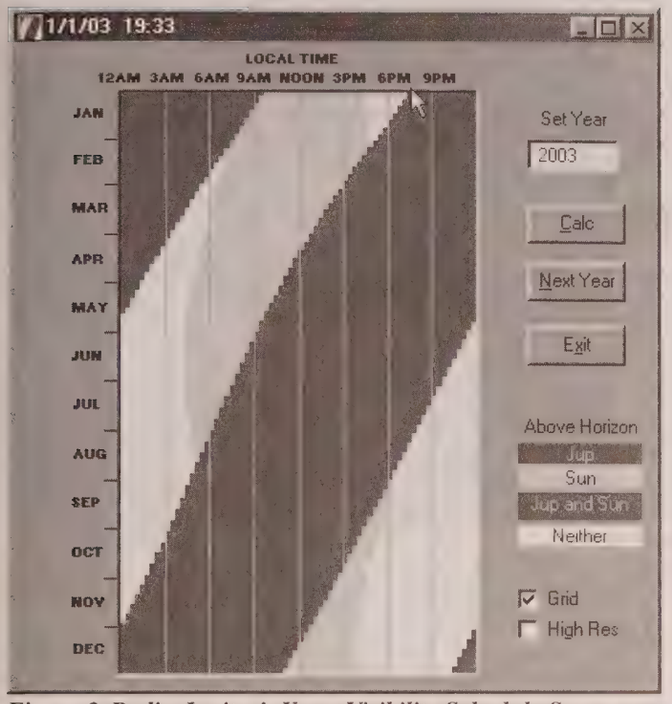

Figure 3 Radio-Jupiter's Years Visibility Schedule Screen

about the radio equipment details next time.

Without going into more science, we have seen that a number of factors effect the transmission schedule of Jupiter. In summary these include: position of Io relative to Jupiter, the "visibility" of Jupiter relative to our position on Earth, and Jupiter's magnetic field orientation relative to Earth. But if you have **Radio-Jupiter Pro 3.0.23**, a program available at **http://www.radiosky.com**, you don't have to be a rocket scientist to predict Jupiter's radio emissions schedule.

The Radio-Jupiter Pro 3.0.23 declares its three-fold purpose as:

1. Predicting likely times when Jupiter's emissions may be heard.
2. Providing positional data for Jupiter from your location.
3. Providing visualization and educational tools to help you.

I ran the program on a Pentium I, 233 MHz computer with 128MEG of RAM under Windows 98.

Figure 1 is Radio-Jupiter's main screen displaying details for Jupiter and the Sun. However, before we can use the program, we must enter our location on the Earth. The program makes this very easy. Direct your attention to the twelve picture icons seen at the top of Figure 1. Clicking the first icon on the left allows us to set our specific location data. This can be entered via a database of cities of the world, or by simply pointing to our location on a world map. Your time zone relative to GMT must also be entered. Now we are ready to use the program for predicting Jupiter's radio emissions.

When Should I Listen?

The Daily Noise Storm Predictions screen, Figure 2, is the heart of the program. In our quick study of the physics of Jupiter, we saw that the complex interactions of a number of factors results in various modes of radio emissions. This screen displays the prediction of six emission modes over a 24-hour period. These predictions are presented both in graphical and chart form.

The graph has lots of color coding, which makes the analysis very easy. For example, the background color quickly indicates if Jupiter is "observable." As the planet gets lower in the sky, the probability of hearing it also goes down. If the planet is below the horizon, the background color of the graph is a dark blue. The lighter background, seen from 1900 to 0900 (next day) local time, indicates you have a chance of hearing Jupiter if storms are predicted to occur during this period.

Mode A, B and C (shown at the left side of the graph) are predicted to be active during the "possible" period from my location today. The three horizontal bars show this in the lighter background.

For those of us who are into optical observations, clicking the fourth icon from the left on the main screen displays a Sky Map tailored to your location, day and time.

Lots More!

Radio-Jupiter Pro has many more useful features. One of my favorites is the Yearly Visibility Schedule shown in Figure 3. This screen, accessed from the third icon from the right in the main screen (Figure 1), gives the user a snapshot of the "possible" listening times by day and time for the whole year. This screen quickly shows the time of day for possible listening periods for a given period.

On this screen the dark regions are "possible" listening times. Using the cursor, the exact date and time for a region is displayed. For example, during January 2003, Jupiter listening from my location will not be possible from 7a.m. to 5p.m. Keep in mind that these are only potentially possible listening times and depend on Jupiter electrical storm predictions. ...Let's see, can I go to that New Year's Eve party next year or is Jupiter going to be in listening position? (A no-brainer if I value domestic tranquility.)

Radio-Jupiter Pro 2.3.23 is a pleasure to use. The Help file is extensive and will answer any questions you have about using the program. A free 30-day evaluation version is available at **http://www.radiosky.com**. The full program cost is $19.95.

❖ Next Time

Now that we know the how, when and where of Jupiter listening, next time we will look at suitable shortwave receivers and antennae. Most of you already have all the required equipment. We'll suggest some receiver settings to increase your chances of success.

Finally, we'll look at a computer programs which allow you to capture, display, store and share what you hear. One program also lets us take receiver input from radio observing stations around the world via the Internet. Till next time ... Stay tuned for Jupiter.

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MT REVIEW

WiNRADiO WR303i Shortwave Receiver

By Bob Grove

Mention the name "WiNRADiO" to any radio enthusiast as well as government, military and institutional radio communications professional, and the image of a highly-flexible, computer-hosted receiving system immediately comes to mind. Terms like "cutting edge technology" and "non-traditional design" may also fit the lexicon.

This prominent, Australian-based company has just released their latest product, the WR303i, a versatile, 9 kHz-30 MHz, multimode receiver on a PCI card, designed for modern computer platforms. Intended for hobby and experimental applications, this world's first dedicated shortwave receiver on a PC card lists for $499.95.

An important distinction between computer-hosted radios and the new WR303i is that the entire final intermediate frequency stage and an all-mode demodulator are executed in software; this "software defined receiver" (SDR) offers extensive applications opportunities unavailable in traditional receivers:

1. It makes it possible to quickly change the characteristics of a receiver, such as adding new detection modes, by a simple software change.
2. Improvements may be made without changing a single component merely by enhancing the software algorithms.
3. Advanced features, such as continuously-variable IF bandwidths, may be offered without any additional hardware.
4. Higher performance can be achieved at lower cost than using traditional hardware designs.
5. Unit-to-unit performance is more uniform in software than in hardware production, which depends on component tolerance.
6. And in the case of the new-generation WiNRADiO products, the user's own computer sound card provides all the processing power needed for these advanced features rather than having to depend upon a fixed DSP circuit on a receiver card.

The G303i is the world's first commercial receiver using a computer sound card for its DSP, not only a clever concept and more consumer-affordable, but often more powerful than receiver-integrated DSP circuitry. It also allows for user experimentation and custom refinement. Receiver self-tests and spectrum analysis, available only on more expensive competitive receivers, are readily provided on this model (see *What about those two demodulators?* below).

❖ Specifications

Detection modes include AM, AMN, AMS, LSB, USB, CW, FM3, FM6, FMN. An upgrade "Professional Demodulator" offers the addition of DSB and ISB. Other upgrade modes, including DRM (Digital Radio Mondiale), are expected shortly.

Extraordinary 1 Hz tuning resolution is provided, making exact signal selection a reality. The factory claims a dynamic range of a husky 93 dB, with a third-order intercept point (IP3) of a laudable +5 dBm at 20 kHz spacing. The on-air performance of this receiver would seem to verify their claims.

So the fine tuning is impressive, as are the dynamic range and overload immunity; let's take a look at the selectivity specs (-6 dB BW):

AM, 6 kHz; **AMN, AMS**, 4 kHz; **LSB, USB**, 2.3 kHz; **CW**, 0.5 kHz; **FM3**, 3 kHz; **FM6**, 6 kHz; **FMN**, 12 kHz. The Professional Demodulator option offers continuous 1 Hz to 15 kHz slide-adjustable bandwidth – an astounding feature to hear when invoked!

The sensitivity specs are equally impressive (10 dB S/N on HF, 30% modulation on AM): **AM**, 0.9 uV; **LSB, USB**, 0.3 uV; **CW**, 0.1 uV; **FM**, 0.2 uV. Such sensitivity assures narrowband signals like CW to be clearly receivable at –135 dBm MDS (minimum detectable signal). With a sharp filter selection using the Professional Demodulator, signals as weak as 30 nV (0.03 uV) are distinct.

Much of this sensitivity is contributed by the low phase noise of the oscillator, typically –148dBc/Hz @ 100 kHz. Clearly this radio meets or exceeds the competition head-on, and other published reviews from leading radio journals are noting the same superiority.

While the factory reminds us that these specifications are subject to change, our experience with WiNRADiO is that the product only gets better. The manual, on the other hand, does need (and is in the process of) augmentation. The basic features of the WR303i are intuitive to access, but there are many hidden functions and virtues that need an explanation.

The factory is aware of this, adding the missing directions as they are discovered, and placing them on their web site. They will be printed in future revisions of the manual, but users are well advised to visit WiNRADiO's web site often to learn more about their new receiver!

❖ Let's try it out

Loading the WR303i operational software to your computer is simple by following the defaults in the automated sequence. System requirements specify a 500 MHz processor to control the filter lengths in real time. In practice, 250 MHz will probably work, but a slow processor will result in slower response time. An SMA connector (along with a BNC adaptor) is provided to link the receiver to an external antenna.

A clever CPU load meter on the panel reveals just how much of your computer's CPU resources are being used at any one time – most revealing! Don't run other memory-intense applications while using the G303i; too much taxation on your computer's CPU will slow the receiver's real-time responses, initiating fractional-second delays in both reception and functional activation (roughly 100 milliseconds in our test on an overburdened 600 MHz processor running multiple applications).

WiNRADiO
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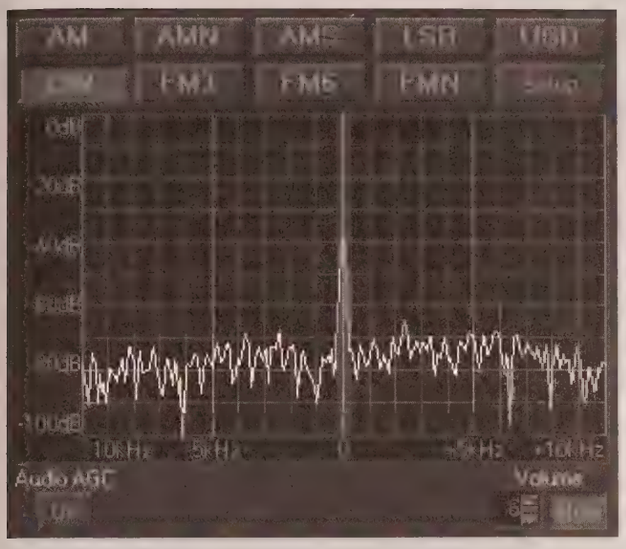
WiNRADiO

An additional hint: Any receiving antenna in the vicinity of a computer, especially one with a CRT monitor, is inviting disaster. Radiated noise is severe, and no receiver can make things better. WiNRADiO engineers



favor well-shielded, low-emission computers like the IBM NetVista M series, especially when used with a flat-screen (non-CRT) monitor. And don't forget to move the receiving antenna, fed by good-quality coax, as far as practical from the host computer. We concur.

With the program properly installed, the next item on the agenda is to adjust the audio levels between the WR303i and the computer's sound card input. WiNRADiO has provided two on-screen slider controls for this task because of the large differences among sound cards. The user simply tunes in a clear signal and slides the controls for best, undistorted intelligibility.

❖ Tuning in

As with all WiNRADiO receivers, a center-panel tuning dial is activated by your computer mouse. It can be rotated slowly by pressing either the left or right mouse button to tune the receiver lower or higher in frequency, respectively. Alternatively, a wheeled mouse makes tuning feel even more natural.

Tuning increments may be user-selected to match standard band plans, or refined all the way down to 1 Hz, adequate for the most demanding applications. And frequency stability is superb on LSB/SSB because of the DSP processing – no additional oscillators are present to contribute frequency drift.

Single-press keys address the multitude of modes available on this receiver. Filter-default filter selections are good, and the ability to user-define these settings is immensely helpful.

There are two expected functions that are absent: sideband-selectable synchronous AM detection and some type of noise reduction. Admittedly, the absence of SSB AM synch is adequately compensated by simply using USB or LSB on AM signals suffering fade or adjacent-channel interference. Just tune in the signal, hit the appropriate sideband key, and trim the tuning knob for natural-sounding audio.

But the absence of noise reduction in our modern electronic environment can be a problem in electrically-noisy areas. WiNRADiO spokesmen pointed out that their existing Advanced Digital Suite software, which provides the noise blanking function in addition to many other signal enhancement and processing facilities, will be soon available for the G303i. There are also accessory DSP speaker systems available at reasonable cost that can substantially reduce electrical interference.

Direct frequency entry is easy: Type in the appropriate frequency, tagged by "M" (MHz) or "k" (kHz) and the radio will instantly lock on to that frequency. But those of us familiar with the long-accepted convention of expressing frequencies below 30 MHz in kHz may not appreciate the receiver's insistence that all frequencies be displayed as MHz. If you type in 11565 kHz, the readout will show 11.565 MHz.

❖ What about those two demodulators?

As listed above, the standard (supplied) demodulator software is adequate for the vast majority of conventional shortwave listening needs. Beyond the detection of audible signals, and the selection of audio AGC (normal receiver AGC stages are defaulted), it also offers a drop-down spectrum scope, revealing signal activity in real time on user-selected swaths of spectrum.

The optional Professional Demodulator allows considerably-expanded functions, including DSB and ISB modes, additional audio AGC adjustments, a continuous IF bandwidth slide from 1 Hz to 15 kHz, user-defined IF bandwidth presets, increased receiver sensitivity (as much as 2 to 9 dB, the result of optimized filter settings), filter shaping, dual spectrum analyzers assignable to various points in the on-screen block circuit diagram to optimize reception, a vector voltmeter showing amplitude and phase differences between the two selected points, and metering of total harmonic distortion (THD) and SINAD as well.

If the user wishes to revert to factory defaults, it can be done at the press of a key.

This receiver is a gadget-lover's dream! But it isn't fantasy; for the first time in consumer technology, the shortwave listener can tailor his receiver to his own requirements, independent of factory-set parameters. If we were reviewing the new WiNRADiO for a film, we'd give it two thumbs up!

WiNRADiO G303i is available from Grove Enterprises for $499.95 with the standard demodulator. Professional Demodulator $99.95 if ordered with the receiver, $199.95 if ordered separately.

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MT REVIEW

Delphi's SKYFi XM Satellite Radio System

By Ken Reitz

In the evolution of satellite television, it took 15 years to see the dish size drop from 10-ft in diameter to 18-in and for receivers to go from stacked table top behemoths to laptop sized boxes. But, direct broadcast satellite radio needed no such evolution. Since its introduction two years ago, satellite radio has jumped directly into the future.

Two years ago, two companies began broadcasting in the newly formed Digital Audio Radio Service (DARS) in the 2 GHz band. XM Satellite Radio and Sirius Satellite Radio use proprietary and incompatible technology and have been in a struggle for market share and consumer acceptance. With the introduction of the SKYFi XM satellite radio receiver system, XM's system may have shot ahead, because, now, satellite radio is no longer just for the road.

Using Delphi's SKYFi

The SKYFi XM satellite radio receiver system, introduced late last fall, nearly defies description. It's hard to believe you can tune in 100 channels of "CD quality" audio services on a receiver which measures just over 4-1/2 x 3 x 1-1/4 inches deep and weighs just ounces. On top of that, it does so with the help of an antenna just 2-1/2 x 3-1/2 inches. It is nothing short of amazing.

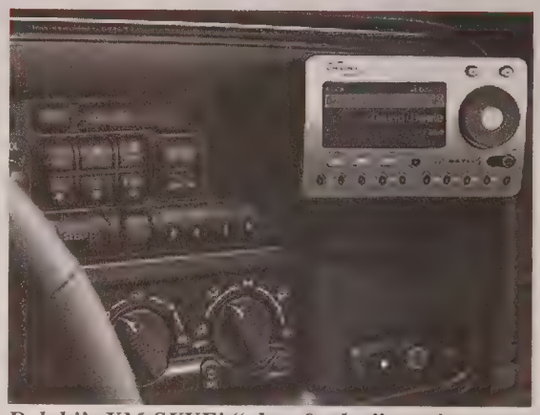
Made by the Delphi Corp, a long-time maker of in-vehicle electronics, the SKYFi "plug & play" satellite radio is incredibly easy to install. After opening the box I had the system up and running in just minutes. It couldn't have been easier. The receiver slips onto the base, the AC adaptor plug, antenna plug and a mini-stereo-to-RCA patch cord also plug into the base. The antenna which pivots from flat to perpendicular on its own base is positioned so that it faces south.

After pressing the "power" button the 2-1/2 x 1-3/8 inch, amber-colored LCD screen comes to life to display a range of information. The top line indicates the music category on the left and there's a three-bar signal meter on the right. The next line shows the specific channel and its XM number while the third and fourth lines show the artist and the name of the tune or program playing. The signal meter stays on at all times regardless of what channel is viewed.

For initial installation a 5-segment signal meter – which displays satellite as well as terrestrial reception – can be brought to the screen by pressing "menu" and rotating the "tuning" knob to highlight the "antenna position" setting. Pressing the lighted XM button in the center of the tuning knob activates the display. In my area there was no terrestrial reception.

Similarly, accessing the various categories and their channels can be done by pressing the two category buttons above the tuning knob and scrolling through the offerings. Pressing the XM button brings up the highlighted channel.

The audio output from the SKYFi can be plugged into your stereo system and played through your speakers or it can be plugged into the AUX jack of any radio. In testing the unit I first set it up in a bedroom on a Bose Wave radio and enjoyed superb audio. The line output of the receiver can be increased to accommodate different line inputs. But, if it's up too high it could distort the audio. You might have to adjust the line out, depending on what you plug the audio into. The factory preset will work for most stereo inputs.



Delphi's XM SKYFi "plug & play" receiver pops into a boombox, your car or home adapter.

The display can be enlarged via the remote control or front panel so that it can be easily read from 15 feet away. Accessing channels and menu items with the very small and ergonomically curved remote is easy. Direct channel entry is done only through the remote and, until you've memorized the channel line-up, you'll need the handy XM Channel Guide nearby. I recommend laminating it, as it will see a lot of wear in the first month or so.

The large five line SKYFi display shows 5 channels at once and allows you to check out what's playing on other channels before you switch.

The Line-Up

XM channels start with #4 "The '40s" (Big Band/ Swing/ '40s) to #171 Open Road (Trucker's Channel). In between are a wide variety of music, news, talk, sports, comedy and even old time radio. There are quite a few gaps in the numbers, which will allow for future expansion.

XM offers 18 channel categories starting with the decades (music from the '40s to the '90s with a different channel for each decade); six country, blue-

grass, and folk related channels; 31 rock, hits and urban music channels; 11 Jazz, blues, and dance channels; 10 Latin and "World" beat channels; 29 news/sports/comedy/advice channels; three classical, two children and two Christian music channels.

Many of the 29 news/sports/talk channels are audio feeds of familiar cable-TV fare such as Fox News, CNN, Headline News, CNBC, C-SPAN, etc. Others are feeds from familiar AM radio networks such as ABC News & Talk, Bloomberg Radio, CNN en Espanol, ESPN Radio, etc.

XM does not censor any of their channels, and as a result there are a few which some listeners might find offensive. XM has tagged those channels in the guide and they can be locked out of the line-up using the remote control. There is one other category called "Premium" for which additional fees will be charged if you wish to subscribe. Right now there's only one channel in this category: Playboy Radio.

You can group your favorites in the "preset" mode on the remote so that, using the "up/down" buttons you can scroll through only the channels you like. For the most part XM's announcers are unobtrusive and, as in the example of Ngoma (the African channel), add real value to the experience. How would I know who these artists are and where they came from, if not for the expertise of XM's announcers? You may also recognize some of these announcers, because XM scoured the nation for the top people in each genre.

The Price Tag:

Delphi's SKYFi XM Satellite Radio components

SKYFi receiver $129.99
Includes receiver with remote control.

Vehicle Adaptor Kit $69.99
Includes vehicle cradle, magnetic roof mount antenna, cassette adapter, cigarette lighter power adaptor and mounting brackets.

Home Adaptor Kit $69.99
Includes home stand, AC power adaptor, home antenna, and connecting cables.

Delphi BoomBox $99.99
Self-contained music system requires SKYFi receiver. Powered by AC adapter or 6 "D" cells (not included). Complete Delphi BoomBox SKYFi receiver system: $229.99

Optional Accessories:
50-ft home antenna extension kit $39.99
Auto FM modulator kit $49.99

Charges:
Monthly service: $9.99
Service Activation Fee: $14.99
Other fees as well as state and local taxes may also apply.

Sources:
http://www.xmradio.com/skfi (800-852-9696)
http://www.delphi.com/electronics/skyfi (866-227-9071)
SKYFi is available nationwide at all major electronics outlets including Best Buy, Circuit City and Crutchfield.

The SKYFi Ups and Downs

Until the introduction of SKYFi, XM listeners weren't getting the full value out of their subscription. Imagine paying for a 24 hour/day audio service but using it only for the one or two-hour commute most people have. Now, subscribers can pop the SKYFi out of their car and bring it into the house to enjoy for the rest of the day.

The antenna comes with a 20-ft cable which should be all most people will need. If you do need more they sell extensions (see below). They advise against making up your own cable. But, before you order an extension, do a little experimenting with locations. My stereo is on the north side of the house nearly 30-ft away from the nearest south facing window. So I tried the antenna in the attic and it worked just fine. "Seeing" through 5/8" roof decking, rolled felt and asphalt shingles was no problem for this antenna. I got a perfect signal.

However, your reception might not be as good if the building in which you live is built of concrete and glass, has a very tall building directly to the south of yours, or is an older metal covered mobile home. Remember, we're dealing with line of sight microwaves and the satellite signal doesn't penetrate metal (aluminum blinds could block the signal) or water, though I had no problems receiving through curtains, thermal shades and a heavy rain.

In fact, the receiver and antenna are so sensitive and the satellite transmission is so powerful that I just set the antenna on top of the shelf where the stereo is and it was able to pick up through the additional 1/2-in sheetrock, 15-in insulation, 5/8-in attic floor decking and the rest of the roof with no loss in signal. I really only needed a 5-ft antenna lead!

The remote control uses a lithium CR2032 battery to keep down the size and weight. Radio Shack sells replacements for $2.50. Other than the "mute" function, the remote cannot control program volume, so you'll have to use two remotes for that convenience. There's no "back" or "last" channel button to quickly go back to the previous channel you were listening to. In my remote control test, I found I could bounce the IR signal around a 90 degree corner to access the receiver.

The LCD screen allows only 16 characters to be displayed on a line. This will leave you guessing on some songs and groups whose names and titles are unceremoniously hacked off the display. Still, it's better than some XM car radio displays which allow considerably less to be seen. The display does not indicate the composer, album title, or album number.

Delphi's XM SKYFi Satellite Radio. It's not just for the road anymore. Bring it on home and tune into XM's audio rainbow. (Photos courtesy Delphi Corp. & XM Satellite Radio)

The SKYFi receiver is designed to be used in your car with the car adapter kit or at home with the home adapter kit (also below). And, by the time you read this, Delphi will have released its ultimate portable: the Delphi XM Audio System. This is essentially a boombox into which you slip the Delphi XM receiver. It's designed as a stand-alone unit which can be used anywhere in the house independent of any other audio source (see sidebar for price).

SKYFi's audio compares favorably with most stereo equipment. And, it will be a pleasure for most *MT* readers to hear the BBC World Service in high fidelity without the crashing and fading of the old shortwave bands. The old time radio programs come alive again with good fidelity sound as does "Sonic Theater," the book and drama channel.

All XM channels have announcers and 64 channels have commercials. Listeners should be prepared for changes in channel line up and the addition of commercials to other channels in the future.

XM's Future

XM's original debut date was 9-12-01. Needless to say, it was postponed. The rocky start signaled the rough road ahead for the fledgling satellite radio industry. Since then, the wobbly economy and collapse of the high tech boom have left XM's own fiscal future shaky. However, worries about XM's early demise were set aside in January with a massive infusion of capital which should allow the company to sail smoothly into the first quarter of 2004.

Still, market watchers are cautious about this company's future, because in addition to a sinking share price, XM's subscriber rolls have been slow to develop. However, the company is hoping to gain big numbers this year as new General Motors cars come equipped with XM radios built-in. GM has a big stake in Hughes, XM's parent company.

It's still too early to guess how the future will treat XM, but right now it provides a real service to areas of the country underserved by terrestrial radio. To the rest of the country it brings welcome competition to the shrinking choices offered by most monopoly dominated local radio stations.

External Antenna Jack on Sangean ATS-909

The Sangean ATS-909 is a great little radio. Contrary to popular opinion, connecting an external antenna to the ATS-909 external antenna jack using a mono (not stereo) 1/8" plug DOES disconnect the internal ferrite antenna. The antenna jack is a "stereo" or "tip-ring-sleeve" style 1/8" jack, and when the ring is grounded (as occurs when a MONO 1/8" plug is inserted into the jack) the internal ferrite rod antenna is disconnected.

If a stereo 1/8" jack is used, connect the hot external antenna lead to the tip of the plug, and the ground lead from the antenna to the sleeve. Then connect a SPST switch between the ring and sleeve (ground). This allows one to leave the external antenna always plugged in.

For MW and LW, open the switch if you want to use the internal antenna. Close the switch if you want the external antenna to be used for MW and LW. If you always want to use the internal antenna for MW/LW and the external antenna for SW, use a tip-ring-sleeve (stereo) 1/8" plug as mentioned earlier and leave out the switch. Pretty cool!

If you always want to use the external antenna for all bands (LW/MW/SW) then use a tip-sleeve (mono) 1/8" plug with the hot antenna lead wired to the tip and the ground lead from the antenna wired to the sleeve. (This is the way that the supplied ANT-60 portable shortwave reel antenna is wired.)

Greg Latta AA8V
Frostburg State University
http://greglatta.com

Interference Filter for Medium Wave DXers

This simple circuit can be used along with your medium wave radio receiver to suppress strong interference signal from nearby transmitters at your location. Some of you experience signal interference from a nearby mediumwave transmitter, which is not only received on the dial, but also at various points all over the dial, ruining weak signals from distant stations (DX stations).

This simple filter, made around just two components (L1 and vc1),can be placed in between receiver and your medium wave aerial. It will severely attenuate the strength of the local station, which may stop it overloading the front end of the receiver.

This filter simply consists of a tuned circuit (L1 and vc1), adjusted to coincide with the frequency of the stronger station. This filter provides a sharp response, as tested with my Sony ICF7600D General Coverage Receiver. The coil L1 is an easily available medium wave oscillator coil or antenna coil. You can find a suitable coil from any old MW receiver.

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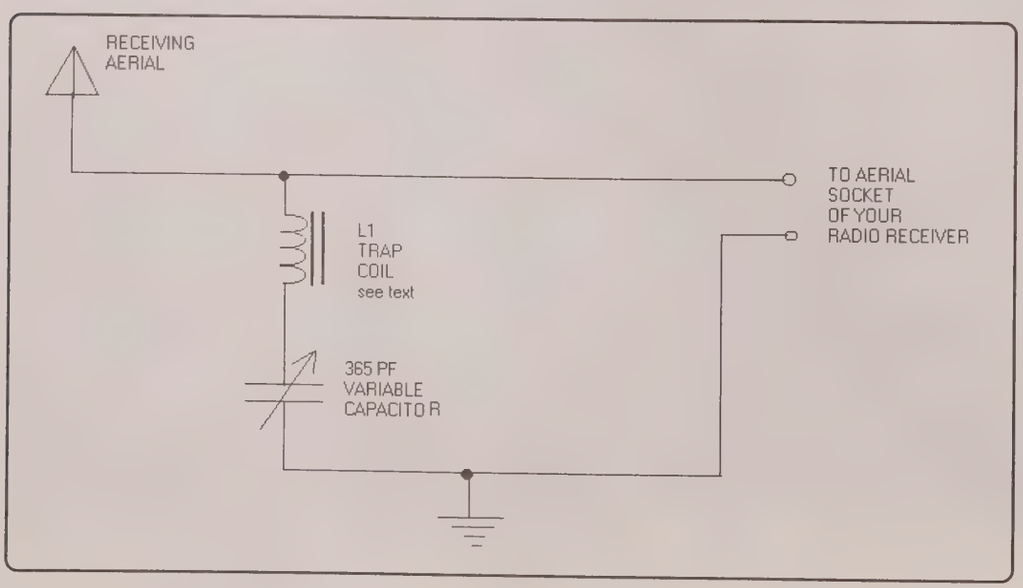
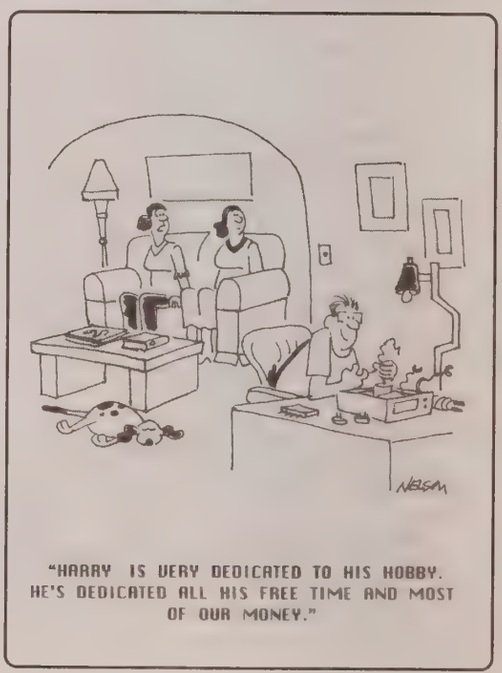


This is your equipment page. Monitoring Times pays for projects, reviews, radio theory and hardware topics. Contact Rachel Baughn, 7540 Hwy 64 West, Brasstown, NC 28902; editor@monitoringtimes.com.



Jock Elliott KB2GOM
jockelliott@monitoringtimes.com

Galaxy's DX 2547 CB Base Station Shines

Honesty demands that I make a clean confession right up front: I have a special place in my heart for Citizens Band Radio. CB is where I had my first exposure to the magic of two-way radio, and the sense of wonder has never left me.

In its official website, the Federal Communications Commission says: "The **Citizens Band Radio Service** is an HF two-way voice communication service for use in your personal and business activities." CB operates on the following frequencies:

26.965 CH 1	27.215 CH 21
26.975 CH 2	27.225 CH 22
26.985 CH 3	27.255 CH 23
27.005 CH 4	27.235 CH 24
27.015 CH 5	27.245 CH 25
27.025 CH 6	27.265 CH 26
27.035 CH 7	27.275 CH 27
27.055 CH 8	27.285 CH 28
27.065 CH 9	27.295 CH 29
27.075 CH 10	27.305 CH 30
27.085 CH 11	27.315 CH 31
27.105 CH 12	27.325 CH 32
27.115 CH 13	27.335 CH 33
27.125 CH 14	27.345 CH 34
27.135 CH 15	27.355 CH 35
27.155 CH 16	27.365 CH 36
27.165 CH 17	27.375 CH 37
27.175 CH 18	27.385 CH 38
27.185 CH 19	27.395 CH 39
27.205 CH 20	27.405 CH 40

CB operators in the United States may transmit with up to four watts power in AM mode and 12 watts in single sideband mode. Although it is governed by FCC rules, CB requires no license, making it truly "people's radio." Further, CB is located in what once was ham radio's 11-meter band, a chunk of the radio spectrum that is often prone to long-range propagation. So, despite the FCC's rules, which prohibit long-range communications, you can literally pick up the microphone and suddenly find yourself talking to another state or another country. It's no surprise, then, that for many enthusiasts, CB is far more than just a communications tool, it's a hobby.

Over the years that I have been writing this column, a number of manufacturers have continued to make innovative CB radios designed for mobile or portable use. The number of companies, however, that makes a CB base station has dwindled to just a few. That's the bad news. The good news is that the Galaxy DX 2547 is one heck of a radio.

Measuring 4-3/4 inches high by 11-1/4 inches wide by 13-1/2 inches deep and weighing 12 lb., the DX 2547 is a solid medium-sized base station. It's small enough to be installed in a motor home or camper, yet big enough for convenient base station operation. What's more, with appearance that suggests a worthy ham transceiver, it's got "pride of ownership" written all over it.

Giving the Galaxy the Once-Over

Let's take a quick tour of the DX 2547. At the top left corner of the front panel is a pushbutton for power. Below that is a talkback control, which (using headphones) allows you to monitor your own voice. Below the talkback knob is a jack for headphones and below that, a four-pin jack for a microphone.

The upper center section of the front panel is dominated, from left to right, by a front panel meter (for monitoring signal strength, RF power output, SWR level or AM modulation level), a channel display and a six-digit frequency display. Below the frequency display are light emitting diodes for indicating mode, noise blanker, roger beep, and so forth.

Underneath the panel meter are knobs for controlling RF power, microphone and RF gain, tone and DIM, and selecting meter function. Buttons next to these knobs activate the roger beep and public address functions. The lower center section of the radio is dominated by a large tuning knob, which, because of its solid feel and spring-loaded channel detents, has to be the best tuning knob in all of CB radio.

To the right of the tuning knob are buttons for the automatic noise limiter, noise blanker, clarifier, and Galaxy noise filter. Just below those buttons are knobs for mode selection and clarifier adjustment. Finally, on the right hand side of the radio's face are a volume control, squelch knob, and knob for selecting instant Ch. 9, instant Ch. 19, or normal operation. On the back of the rig are connectors for both AC and DC power, a fuse, AC/DC power selector, antenna connector and jacks for PA operation and an external speaker.

The Galaxy on Air

The fit and finish are as good – or better – than any CB I've seen or used. Even better, *so is the performance*. The Galaxy DX 2547 can go toe-to-toe with any other CB I've ever owned (including my beloved Cobra 2000) and not give up a thing. Everything works as it should. Audio with the stock hand mic is crisp and clean and both AM and SSB modes (although a power mic with just a tiny bit of gain will fatten the audio). The receiver does an especially good job of rejecting adjacent channel splatter, and the noise blanker does an excellent job of killing pulse-type noise.

I spoke with one of the owners of Galaxy Radios, and he said, "We started this company because we are CBers. We try to build radios that we would like to own." In my view, they have succeeded – in the Galaxy DX 2547 – in creating a base station that any CBer would be proud to own and operate.

Suggested retail price of the Galaxy DX 2547 is $329. To find our where you can buy one, contact:

Ramko Distributors
3840 Lagrange Street
Toledo, Ohio 43611
Phone: 800-284-7441
Local : 419-470-1802
Fax: 419-470-1801
e-mail: info@ramkodist.com
Web address: www.ramkodist.com

The Galaxy DX 2547, a base station any CBer would be proud to own and operate.

Lawrence Harris
lawrenceharris@monitoringtimes.com

NOAA Satellite Conference Report

The **Satellite Direct Readout Conference for the Americas** was a 5-day event starting Monday December 9, 2002, and organized by the National Oceanographic and Atmospheric Administration (NOAA). The Miami conference was held to update all interested parties – amateurs, professionals and hardware vendors – by presentations from NOAA senior management officials. **Paul Ruscher** and **Wayne Winston** kindly provided me with some notes for inclusion this month.

The transitions planned for the POES and GOES Direct Readout programs were highlighted to an international audience. As expected, the meeting was well attended and there was plenty of time for discussions. Many nations were represented, as was the user community, and the community of vendors that provide hardware and software. From a detailed presentation, I have selected just a few highlights. More will be published in future editions.

GOES

The GOES (Geostationary Operational Environmental Satellite) constellation comprises five satellites (GOES-8 through GOES-12) of which two are always operational at the designated positions over the East and West Coasts. WEFAX has been transmitted by most geostationary WXSATs for decades, but in 1991, a CGMS (Coordination Group for Meteorological Satellites) meeting initiated the concept of replacing WEFAX. In 1998, all CGMS participants, except the USA, committed to the digital Low-rate Information Transmission. At the 1999 CGMS meeting, USA announced plans for LRIT implementation on GOES I-M for January 2003.

One of many interesting items discussed was the transition from WEFAX to LRIT. These will be on a shared broadcast mode from the new GOES East (GOES-12) beginning sometime late in March (approximately), with WEFAX receiving 35 minutes broadcast time per hour, and LRIT receiving 25 minutes. This phased-in transition to LRIT will last two years, and then WEFAX transmissions will terminate around January 2005. GOES West will follow GOES East by a few months, according to the report.

In addition, GOES 12 is the first in a newer series of GOES spacecraft which will have a longer wavelength IR channel and improved water vapor channel (resolution and bandwidth improvements).

NOAA has announced a web site with further information, at **http://noaasis.noaa.gov/WEFAX/** [Note: as at early January, the site had not been updated to reflect the changed WEFAX/LRIT schedule, but the PDF files are instructive for those wanting technical information] All direct readout users are urged to stay tuned to details there, since the next few years will be very exciting, with all the new international satellites and formats.

In addition, NOAA described its new full ground system control center at Fairbanks, Alaska, which will be used to control the GOES-9 spacecraft, operating at 155° E until Japan can launch MTSAT; this provides an additional ground station control facility that NOAA has not had before, complementing their Wallops Island, Virginia, and Goddard Spaceflight Center (Maryland) facilities.

POES

APT is still going to be a significant data stream for years to come (up to 2010 at least), but the transition to LRPT (the low rate imagery stream) is being planned. The constellation of satellites will be improved greatly as other non-NOAA birds are launched, providing many more image pass opportunities.

The conference web site is at **http://noaasis.noaa.gov/miami02/**

My thanks to Paul for his notes, and to Wayne Winston for providing early details of the meeting.

Starting Out – A Beginner's Story

Steve Uhrig introduced himself by posting an image received from his wife **Karensa**'s station – see figure 1. This is an image received by their equipment and processed by the *WXTOIMG* package. Steven explained that no manual manipulations were performed, and added "we're proud of it as a novice effort, starting from scratch knowing nothing."

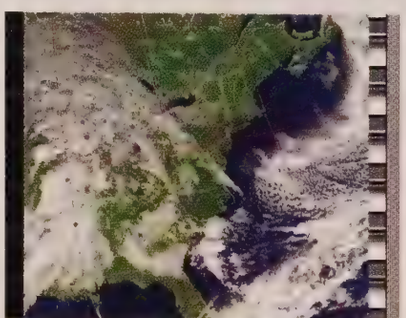


Fig 1: NOAA-17 December 16, 2002 from Karensa Uhrig

Karensa is a former U.S. Air Force meteorologist and "really into weather," says Steve. They have a professional weather station with all the sensors at their home, and built the APT station. A joint project, they climbed ladders and installed everything together – but she operates it.

The station is the Hamtronics receiver, 10m of RG-8X to a Woodhouse antenna mounted on a mast about 8m on top of a one story roof, in the middle of the woods in Maryland. They are surrounded by tall trees. Steve uses *WXTOIMG*, running on his "dinosaur Dell P2-300" machine upgraded from its original Windows-95 to Windows-98SE, with 256Mb RAM, but with monstrous dual drives, formerly a server for his business. "It takes several minutes to build the images with all the enhancements my wife has selected, but we're not in a hurry and the machine was available. It is online constantly, and we update time automatically every hour with NIST, and Keplers manually."

Steve and his wife are very pleased with their images, received several times a day from various "birds." Karensa does all the operations. When they have visitors, her APT station impresses everyone and is a real icebreaker. "Send them home with a printout of an image built before their eyes, and it's something they'll never forget!" explained Steve.

Monitoring Meteor 3-5

A picture transmitted by Meteor 3-5 on December 7 was received by Peter Venlet of Zeeland, Michigan, during its north-to-southbound pass. Peter noted that transmissions start when the WXSAT enters sunlight, several degrees above his horizon. He uses a modified Pro-2066 scanner (with a baseband audio tap) fed by a homebrew quadrifilar helix antenna with Hamtronics pre-amp.

Figure 2: Meteor 3-5 December 7, 2002 from Peter Venlet

Frequencies - Automatic Picture Transmission

NOAA-12 and -15 transmit APT on 137.50 MHz
NOAA-17 transmits APT on 137.62 MHz.
Meteor 3-5 normally transmits APT on 137.30 MHz when in sunlight
GOES-8 and GOES-10 use 1691 MHz for WEFAX

What's NEW

Tell them you saw it in Monitoring Times

Grove Shortwave Directory

By Larry Van Horn

Anyone who listens to the shortwave spectrum owes it to himself to add the 9th edition of the *Grove Shortwave Directory* to his resource shelf. This reliable stand-by has now been entirely revamped and expanded to double its previous size, reflecting the enormous changes that have taken place in HF communications since the last edition of the SWD several years ago. The size increase isn't due merely to new information piled on top of old as is sometimes done; this edition basically started from scratch, throwing out much old and inactive material. Bravo!

The *Shortwave Directory* concentrates primarily on the U.S., but contains a substantial amount of worldwide entries as well, especially in the government, military, and aeronautical sections. Listings cover all services which have activity or frequency allocations in HF – government, military, aircraft, maritime, business, licensed and unlicensed broadcasters (pirates and "numbers" stations) and much, much more. *Ute World* editor Hugh Stegman says, "The US Coast Guard is just an awesome section!"

This is a 467-page book on CD, presented in PDF format. Though not in a strict database format, the book's main focus is all about frequencies. The amount of introductory text to explain service mission, organization, operation, etc., varies throughout the book; much of it assumes some familiarity on the part of the reader. A welcome addition to the *SWD* which provides an overview of spectrum assignments is the HF portion of Larry Van Horn's "Who's Who in the Spectrum" series from *Monitoring Times*.

None of the more recent editions of the *SWD* have included a frequency cross-reference, more easily generated in data-based publications. It is expected that users will make heavy use of Adobe Acrobat's search engine to locate and identify frequencies of interest. Low frequency listeners will appreciate the huge list of nondirectional beacons, which are presented in both by-frequency and by-callsign order.

The well-presented introduction to utility listening notes that information changes constantly. As an example, the Global High Frequency System (GHFS) became outdated about the same time the CD was released. Fortunately the change was in name only; the content is still valid.

Although minor errors are noted here and there, this reader's primary criticism is the difficulty of navigating through the document. A directory, by definition, is a resource for looking things up quickly. This directory is way too comprehensive to be covered in only 16 chapter headings. Fortunately, such things are easy to update on a CD as opposed to a printed book, and I'm sure they will be.

Like many users, I will probably print out the sections I want to be inserted in a ring binder. You have other options, though. To my surprise, though copyrighted, the *SWD* may be printed, or copied (through cut and paste), or you may extract sections or the entire book to your computer. Once on your computer, you will be able to add your own bookmarks, comments, and additions.

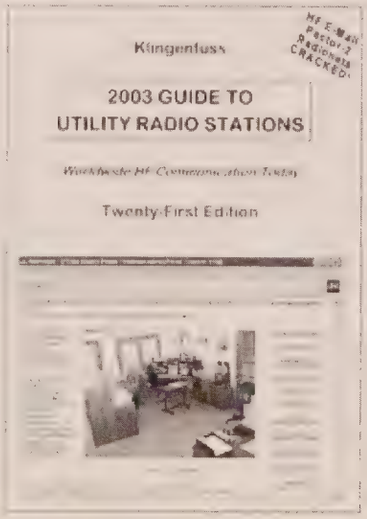
The 9th edition of the *Grove Shortwave Directory* represents a major effort and countless hours of research and data entry by Larry Van Horn. Much material in this edition is found nowhere else, such as schedules and frequencies for all three MARS programs. Though this kind of work can never be said to be truly finished, the *SWD* is the most comprehensive, most up-to-date, and most authoritative guide for North America currently available anywhere. It's available from Grove Enterprises for $39.95 plus $3.50 shipping: call 800-438-82155, email *order@grove-ent.com*, or write 7540 Hwy 64 West, Brasstown, NC 28902.

– Review by Rachel Baughn, Editor

Klingenfuss HF Publications - Utilities

Each year I look forward to seeing a big brown box show up from Germany carrying the latest Joerg Klingenfuss annual publications. Again I was not disappointed. In the brown box this year we had *The 2003 Super Frequency List* on CD, the *2003 Guide to Utility Radio Stations* and *2003 Shortwave Frequency Guide* publications. For purposes of this review a little breakdown is in order.

The *2003 Guide to Utility Radio Stations* contains information on those stations outside the broadcast and ham radio bands (i.e. - non-broadcast stations). The *Super Frequency List* on CD and the *Shortwave Frequency Guide* mentioned above include the utility frequencies covered in the *Guide to Utility Radio Stations*. So if you are looking for all the frequencies (broadcast or utility) you can choose either the book (*Shortwave Frequency Guide*) or the electronic form (*Super Frequency List*) on CD.



I will let my wife Gayle Van Horn review the shortwave broadcast portions of the *Frequency Guide* and *Frequency List* (below), since that is her area of expertise. My remarks are confined to the utility frequencies that can be found in all three annual publications.

The *2003 Guide to Utility Radio Stations,* 21st edition, is billed as "the world's biggest and best guide" to non-broadcast stations in the range from 0 to 30 MHz. The Klingenfuss utility station listings in all three of his yearly publications cover primarily aeronautical allocations, maritime frequencies, some military frequencies, digital diplomatic communications networks, time station broadcasters and more.

The ute radio enthusiast will find listings for SSB and AM voice communications, and Morse code stations, but it is the digital utility station listings that really make the Klingenfuss utility frequency list stand out. His listing of digital mode stations are exhaustive. No other radio hobby publication has the scope and depth of coverage of digital radio networks as the Klingenfuss publications. As an extra bonus for the hardcore ute fanatics, Joerg has included 220 computer screen shots of some of the digital radio stations he has intercepted in the last year. The three publications mentioned above have a total of 10,167 utility station listings that Joerg and his monitoring team have logged during 2002.

In addition to the by-frequency coverage mentioned above, the *2003 Guide to Utility Radio Stations* (582 pages) includes the following extras not found in the CD or the *Shortwave Frequency Guide*: An alphabetical country list of 1,700 stations in 250 countries for rapid access; section of station identifications, call sign formation possibilities, international call sign series, call sign list of the utility stations included in the book; a list of meteorological radiofax/radiotelex stations and schedules; worldwide schedules of NAVTEX (navigational and meteorological warnings) stations on 424, 490 and 518 kHz; NATO Routing Indicator system; name and traffic abbreviations and signals; Q- and Z-code groups, pho-

What's NEW

Tell them you saw it in Monitoring Times

netic alphabet and figure code; SINO and SINPFEMO codes; designation of emissions; classes of stations; terms and definitions; and aeronautical and maritime mobile service frequency allocation plans with folding charts.

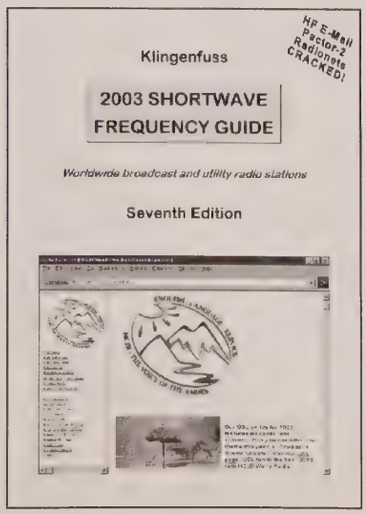
If you are a hardcore utility station enthusiast, then the utility lists in Joerg Klingenfuss publications are well worth purchasing. You can purchase the *2003 Guide to Utility Radio Stations* (#2743-$39.95) and *2003 Shortwave Frequency Guide* (#1571-$34.95) plus $4.95 each shipping from Universal Radio (**http://www.universal-radio.com/**), 6830 Americana Parkway, Reynoldsburg, OH 43068 (Orders 800-431-3939 or info 614-866-4267). You can purchase the *2003 Super Frequency List* on CD (SFT26-03) from Grove Enterprises for $24.95 plus $3.50 shipping and handling.

You can also visit the Klingenfuss website at **http://www.klingenfuss.org/** for more information on these and other publications produced by his company.

– Review by Larry Van Horn, MT Assistant Editor

- Shortwave Broadcasting

The new and revised *Shortwave Frequency Guide, 7th Edition,* (and the identical *2003 Super Frequency List* on CD) is now available for 2003. Each year, I add this informative source from Klingenfuss, along with other DXing publications, as an aid in my personal monitoring sessions.



Despite the slickness of other publications that include maps, reviews, features and hourly grids, *Klingenfuss' Shortwave Frequency Guide* remains my favorite. Plain and simple, I call it "no frills DXing," and rightly so: it is very user-friendly to the DXer.

The *Shortwave Frequency Guide* contains over 19,000 entries with the latest schedules that include clandestine, domestic and international broadcasting services. This is the only publication that combines shortwave broadcast and utility stations in one volume.

The broadcast section contains the latest frequency schedules following the winter releases, plus information from an extensive team of international hobbyists and monitors around the world that actively contribute.

Stations are arranged by frequency and start/end time order. Using this layout, the DXer can instantly access information to easily identify all the stations transmitting at the same time on the same frequency. This includes language, target areas, and remarks, despite sorting through a complicated grid system.

Stations may also be viewed using the Alphabetical List of broadcast radio stations, listed with language, start/end, target and transmitter sites. This is a beneficial aid when focusing on just one country.

I have used Klingenfuss frequency guides for years. The *Shortwave Frequency Guide* remains a favorite, and should be considered by those hobbyists who are seriously seeking a "no frills" advantage to their DXing. It is available in two formats with different names: the *Shortwave Frequency Guide* is in soft-bound book form, and the *2003 Super Frequency List* is the same information contained in database format on CD-Rom.

For purchase information, see the review above.

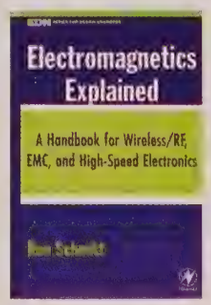
– Review by Gayle Van Horn, columnist

Electromagnetics Explained:

A Handbook for Wireless/RF, EMC, and High-Speed Electronics

By Ron Schmitt

This book is an excellent resource for the person who already has an introductory-level understanding of electronics, and wants to know more about radio waves, antennas, and related phenomena. Here you will find an easy-reading survey of electromagnetics including the concepts of voltage, current, resistance, inductance, and capacitance as they relate to electromagnetics, as well as radiation of electromagnetic energy (as in radio, wireless devices, etc.), and such topics as electrical noise, electromagnetic fields, antennas, transmission lines and waveguides. There are even discussions of microwave ovens, electromagnetic compatibility (abating the source of, or reduction of the effects of electromagnetic interference), and token discussions of Maxwell's equations and quantum physics.



Despite the hi-tech sound of the topics covered, this book contains very little math, and approaches its topics mostly from an intuitive point of view. The author obviously understands his subject very well, and considers his job to be making that subject as easy to understand as possible in a brief survey of the field. He does that job well.

Electromagnetics Explained is not a how-to-do-it book, it is a practical approach to theory. Because it is a survey, none of its topics are covered in depth. If you're looking for a text that provides you with the a more in-depth practical understanding to allow you to start building your own radio or electronic devices then you may wish to consider books like *The ARRL Handbook*, or Horowitz and Hills' *The Art of Electronics*.

Although topics in *Electromagnetics Explained* are presented in a relatively easy-to-understand way, you must be willing to pause at times, and think about what you are reading if you are to reap maximum benefit. And, although the book was written for technicians and engineers, it is clearly within the grasp of the curious, technically-minded radio or electronics hobbyist.

Publisher: Newnes, Elsevier Science, 225 Wildwood Avenue, Woburn, MA; 01801-2041, phone 781-904-2620

– Review by W. Clem Small, columnist

Alternative News

One of the primary reasons folks listen to shortwave radio is to hear how people outside the U.S. view world events. Dan Roberts (who did a short stint as an *MT* frequency monitor) puts together a weekly 30-minute broadcast of news recorded from shortwave radio. It is aired on KZYX/Z Philo, CA, at 7pm Friday evenings, but it's also posted on the internet at **http://www.outfarpress.com/outfarpress/shortwave.shtml** in broadcast-quality audio. All or portions of it are free-to-air. A lower-quality stream is also available for listening on your computer from this or several other sites on the internet. Thanks for this service, Dan! It's a great introduction to shortwave radio for non-hobbyists.

Books and equipment for announcement or review should be sent to " What's New?" c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com

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Closing Comments

This page is open to thoughtful opinions on radio-related topics. Submissions should be about 800 words in length and may be mailed to Closing Comments, care of this magazine, or emailed to editor@monitoringtimes.com

Secrecy Infests Shortwave Relay Deals

by Glenn Hauser, MT columnist

All the major companies (notably Merlin, Deutsche Telekom, TDF, and a vast network in the former Soviet Union), involved in brokering time on shortwave, are less than candid about whom they are relaying. We have both privatization and traditions of government secrecy in Europe to blame for this, along with private companies such as the so-called Transmitter Documentation Project [note the irony in the very name], which allow clients to try to keep secret where their shortwave broadcasts actually emanate from. Some go so far as to release disinformation. Or they keep true info from their own clients, who don't *really* need to know where their signal is entering the ether! Even R. Nederland has suppressed info from its schedule.

Fortunately, astute and experienced monitors can usually figure out the truth, based on operational practices and mistakes, propagation characteristics, etc. But why shouldn't this info be part of the international public record? There are glaring gaps even in the seemingly exhaustive HFCC "public data" schedules (that implies there is also "private data," and indeed there is a restricted part of the HFCC website – without the phony registrations?)

As more and more traditional international services reduce their own shortwave usage, more and more time becomes available on otherwise idle units. Norway and Denmark even consider their own remaining SW relays of domestic services to be expendable if a paying client wants time. With funding always a problem, many are eager to make money by selling time to practically any religious or clandestine broadcaster, as well as to legitimate international services needing a relay closer to target areas.

Despite its self-avowed "public access" status, IRRS, a.k.a. IBA/NEXUS in Milano, Italy, allows no public access to basic information of where it is transmitting from, though a variety of relay sites are obviously available, with powers stated to range from 10 to 500 kW. You'll note this info never came out in the feature articles here in January and February.

Why refuse to disclose transmitter sites? Could shady deals be involved? Under-the-table payments to transmitter personnel rather than to the governments or agencies which own the facilities? It is open to speculation.

It's somewhat understandable when truly clandestine broadcasts don't reveal the site for fear of retaliation or more effective jamming. But when time is purchased from an entity also broadcasting openly, should it not be on the record as part of the overall operational schedule?

There is also the issue of whether government or public broadcasters should be used to propagate contentious political or religious views. RCI for years has seen nothing wrong with relaying Communist stations such as China and Vietnam, whose governments also engage in jamming western broadcasters (but not RCI...). Until last year, RCI provided schedules of all relays through Sackville, but no more.

Now Canada not only propagates communist ideology but favors one religion. For some years, HCJB had been relayed from the UK by Merlin (ex-BBC) transmitters to Russia and the Middle East, but last fall the Arabic broadcast for North Africa at 2100-2230 on 12025 was suddenly switched from UK, to Canada, no doubt for propagational reasons.

This can now be done, since Sackville has become part of the Merlin network. Canada can claim it really has nothing to do with it, and refuse to release schedules confirming this, even though such schedules obviously exist, at least for internal use. At press time, the HCJB website still claimed this was via England, but Sackville is obvious from the strong signal off the back into central North America, not to mention the RCI IDs which precede or follow it!

Jerry Coatsworth, a Canadian himself, reported in the *MARE Tipsheet* this response from RCI when inquiring about relays:

"We regret that we are unable to provide you with this information. The frequency and content information is the exclusive domain of the originating broadcasters. Furthermore, in specific cases, CBC Transmissions, the organisation that coordinates the Sackville facility, has been requested to not release this information. You may, however, request frequency information directly from the originating broadcasters. Once again, we apologize for not being able to provide you this information. Best Regards" *—Steve Lemay, Manager, Presentation, Radio Canada International.*

This policy mirrors that of WYFR, which for years has refused to include along with its own scheduling information, that of Radio Taibei International, which it relays extensively. Could some of the dozen transmitters in Okeechobee be carrying something more covert?

In our *Global Forums*, we always have new clandestines, and a lack of explicit information about sites, forcing us to find out indirectly. While the DX community is up to the challenge, we resent being deprived of accurate information from the source. Politics plays a large role here. Even though we may find out, governments want to maintain deniability in case their clients turn out to be unsavory, or the deals could cause diplomatic problems with target countries.

Even stations which should have nothing to hide, such as Radio Australia, have quit publishing their own comprehensive transmission schedules.

Bob Padula complains: "R. Australia refuses to publish composite schedule on website, or anywhere else, exacerbating growing alienation with hordes of SW listeners in prime coverage areas, most of whom have no facilities to migrate to satellite or RealAudio. RA sees its main audience across Asia/Pacific being serviced through rebroadcasting or relays via local AM and/or FM stations, satellite, and the Internet, and to heck with direct HF delivery!"

Why do we need to know? Relay deals reflect political realities and alliances, and are part of the overall picture. In order to understand better how shortwave signals propagate, we at least need to know where they are coming from. We may even need to know which way to aim our antennas. As long as the broadcasters are not forthcoming, we need a widely dispersed network of experienced shortwave monitors capable of direction-finding!

Casual listeners may not care, but for those of us who do, site information should be readily available. The airwaves belong to us, not them.

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